

Appendix Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: TWS Bluetooth headset

Trade Mark: /

Test Model: S13

FCC ID: 2A96C-S13

Environmental Conditions

Temperature:	23.5℃
Relative Humidity:	58%
ATM Pressure:	100.0 kPa
Test Engineer:	Allen Lai
Supervised by:	Max Zhang
NOTE	N/A

Appendix A: 20dB Emission Bandwidth

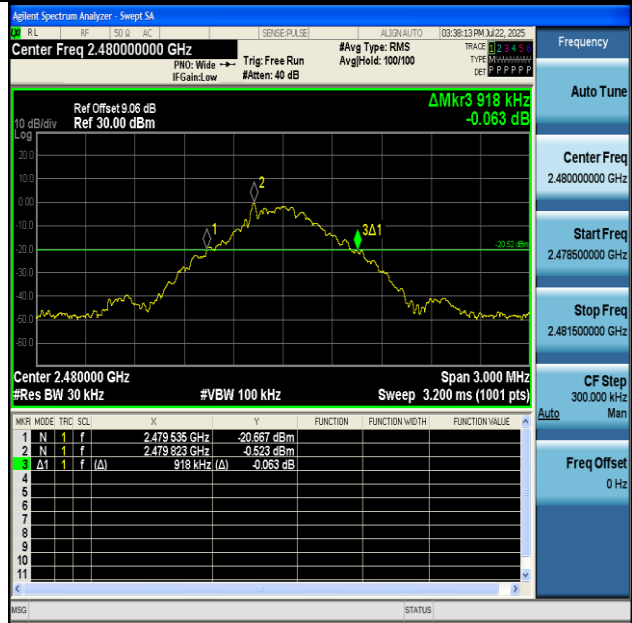
Test Result

Test Mode	Antenna	Frequency [MHz]	20db EBW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
DH5	Ant1	2402	0.945	2401.535	2402.480	---	---
DH5	Ant1	2441	0.954	2440.529	2441.483	---	---
DH5	Ant1	2480	0.918	2479.535	2480.453	---	---
2DH5	Ant1	2402	1.326	2401.328	2402.654	---	---
2DH5	Ant1	2441	1.260	2440.367	2441.627	---	---
2DH5	Ant1	2480	1.320	2479.331	2480.651	---	---
3DH5	Ant1	2402	1.263	2401.358	2402.621	---	---
3DH5	Ant1	2441	1.287	2440.346	2441.633	---	---
3DH5	Ant1	2480	1.275	2479.352	2480.627	---	---

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

Test Graphs





DH5-Ant1-2480



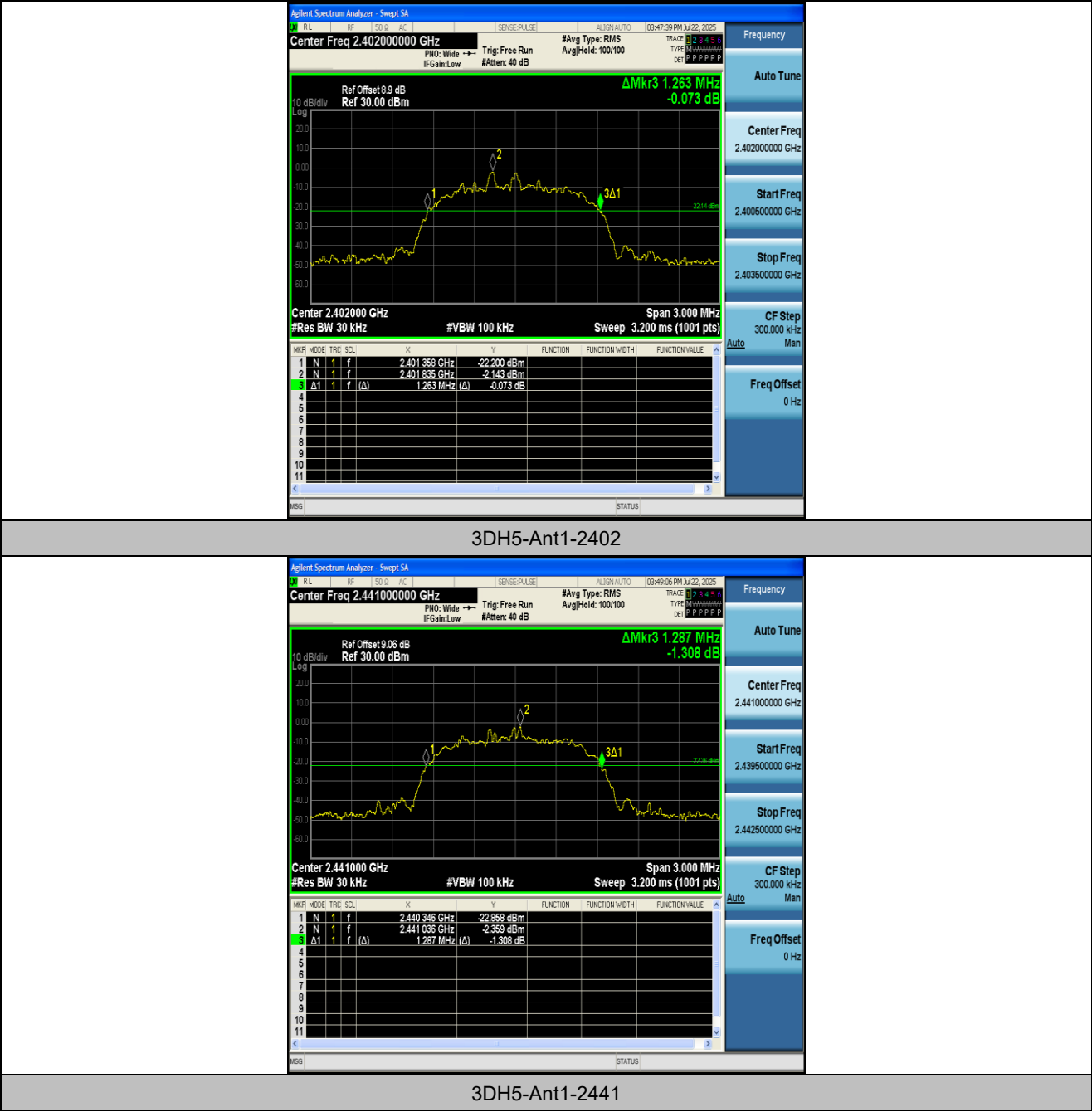
2DH5-Ant1-2402



2DH5-Ant1-2441



2DH5-Ant1-2480





Appendix B: Occupied Channel Bandwidth

Test Result

Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
DH5	Ant1	2402	0.84900	2401.5670	2402.4160	---	---
DH5	Ant1	2441	0.84590	2440.5688	2441.4147	---	---
DH5	Ant1	2480	0.84485	2479.5687	2480.4136	---	---
2DH5	Ant1	2402	1.1826	2401.4007	2402.5833	---	---
2DH5	Ant1	2441	1.1734	2440.4046	2441.5780	---	---
2DH5	Ant1	2480	1.1646	2479.4102	2480.5748	---	---
3DH5	Ant1	2402	1.1824	2401.4088	2402.5912	---	---
3DH5	Ant1	2441	1.1866	2440.4085	2441.5951	---	---
3DH5	Ant1	2480	1.1736	2479.4138	2480.5874	---	---

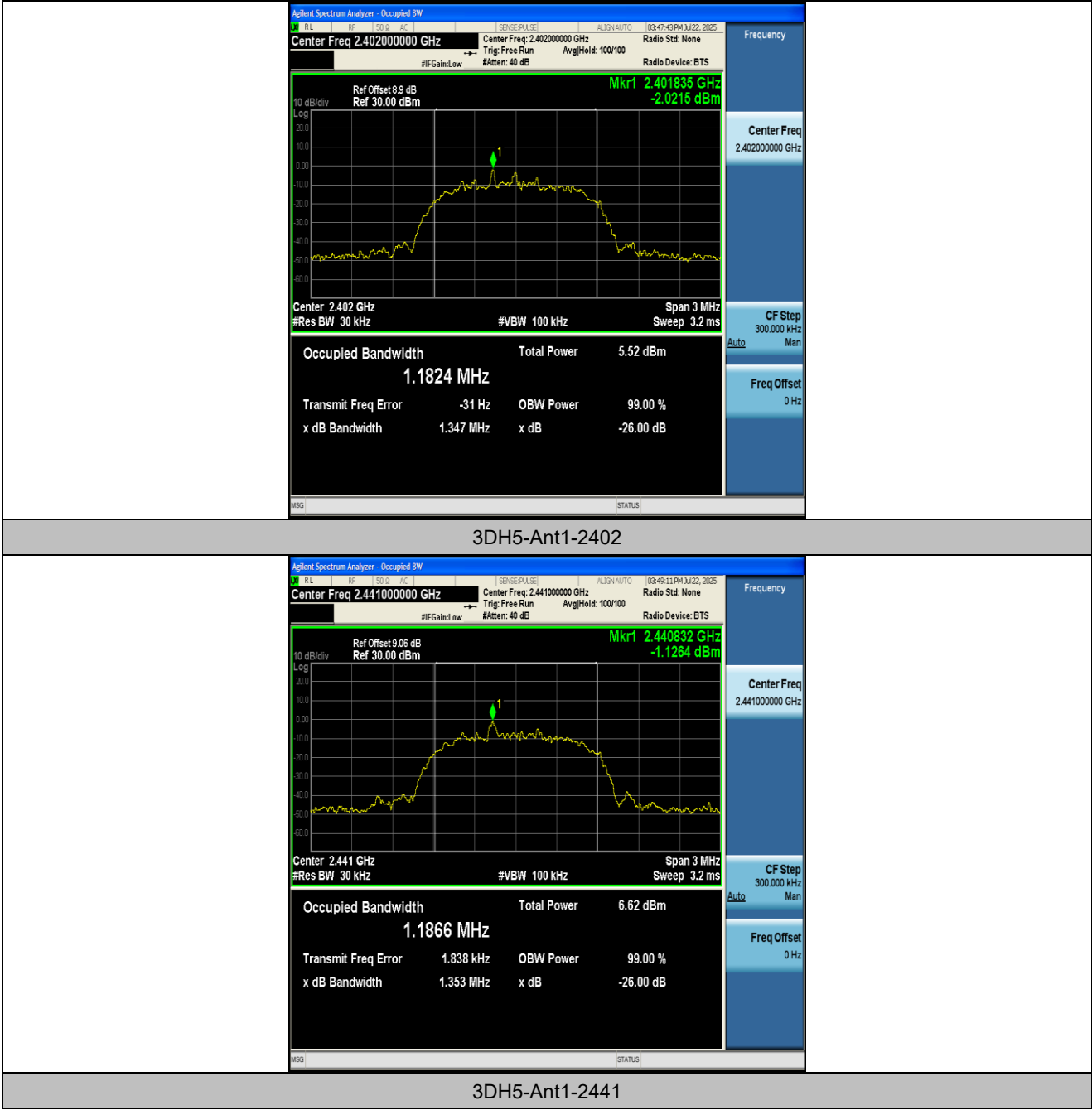
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

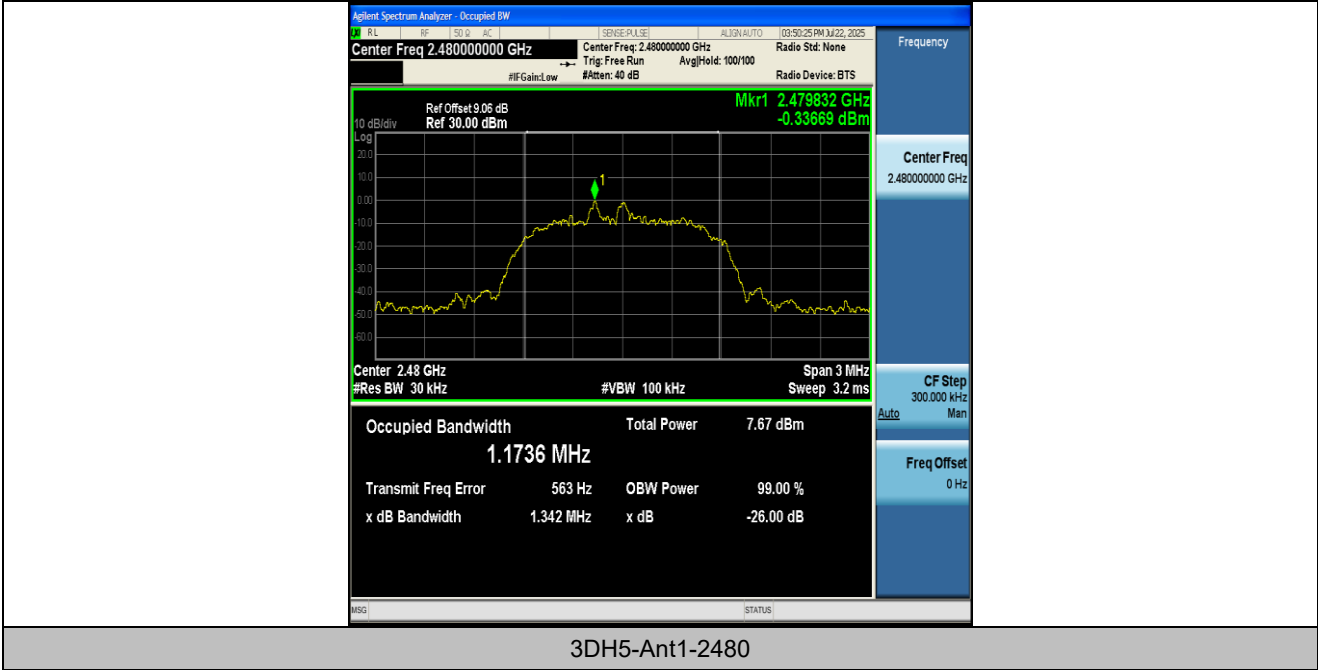
Test Graphs











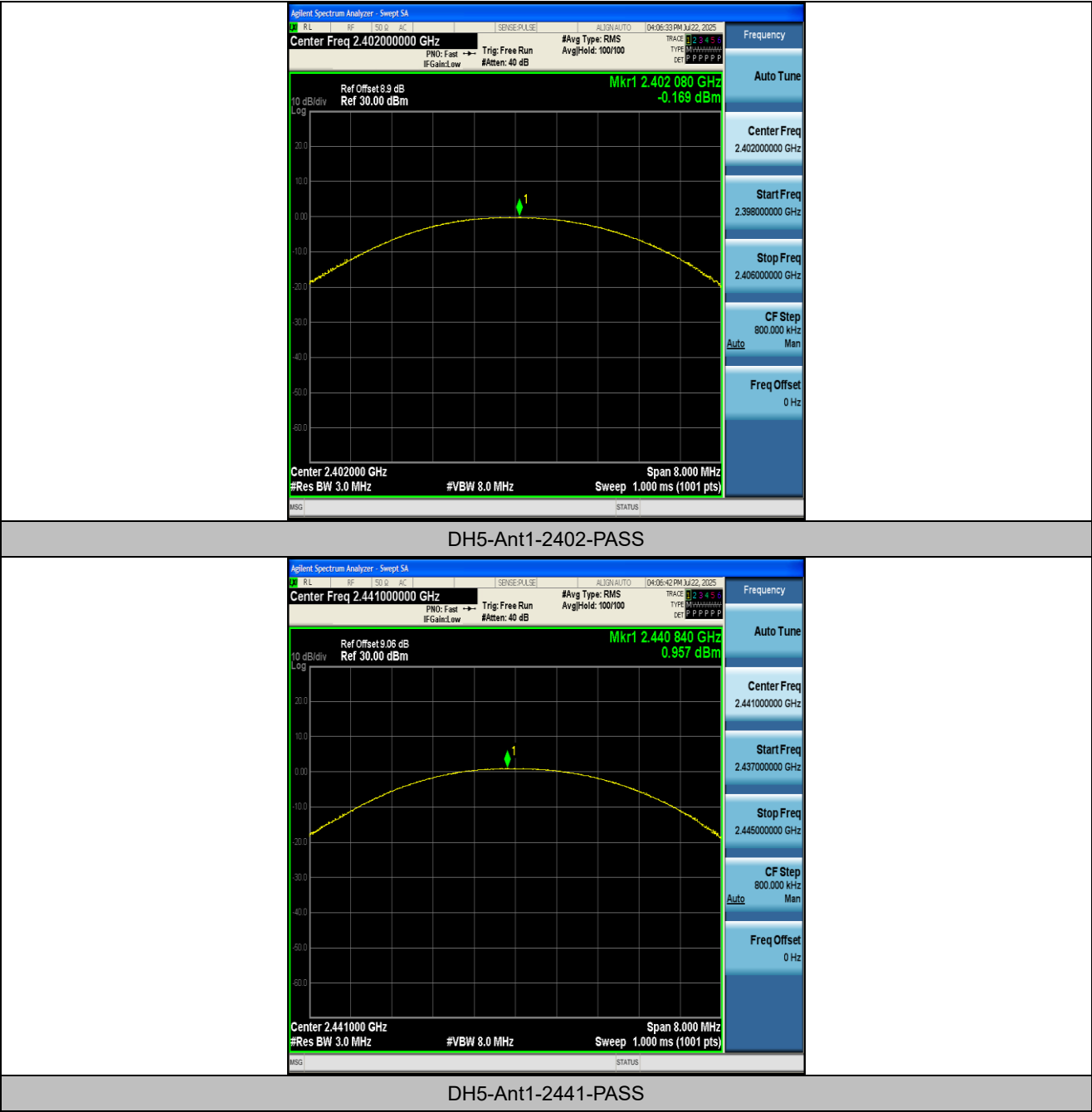
Appendix C: Maximum peak conducted output power

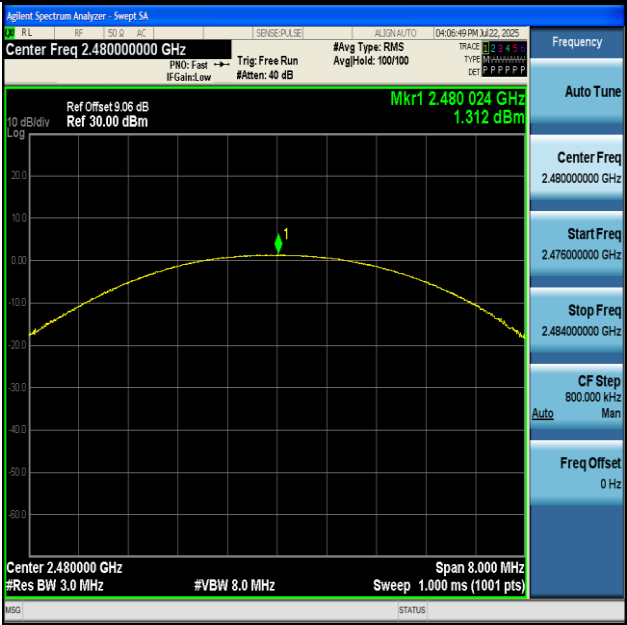
Test Result

Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Conducted Limit [dBm]	Verdict
DH5	Ant1	2402	-0.17	≤30	PASS
DH5	Ant1	2441	0.96	≤30	PASS
DH5	Ant1	2480	1.31	≤30	PASS
2DH5	Ant1	2402	0.41	≤20.97	PASS
2DH5	Ant1	2441	1.61	≤20.97	PASS
2DH5	Ant1	2480	2.04	≤20.97	PASS
3DH5	Ant1	2402	0.80	≤20.97	PASS
3DH5	Ant1	2441	2.00	≤20.97	PASS
3DH5	Ant1	2480	2.39	≤20.97	PASS

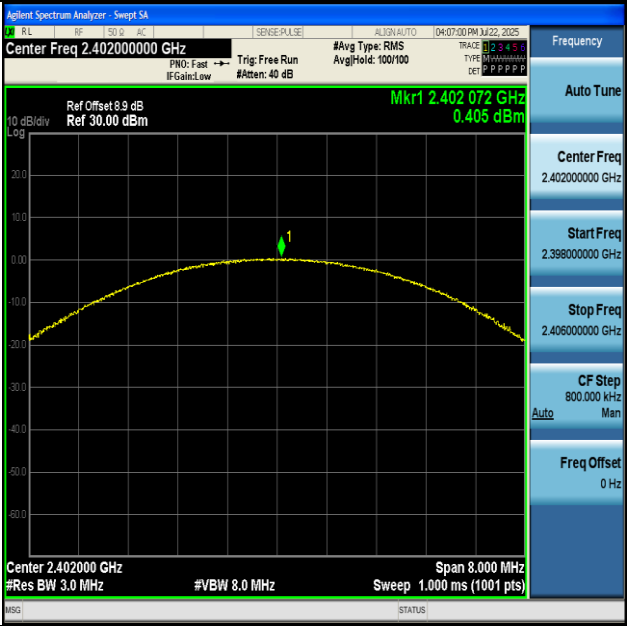
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

Test Graphs

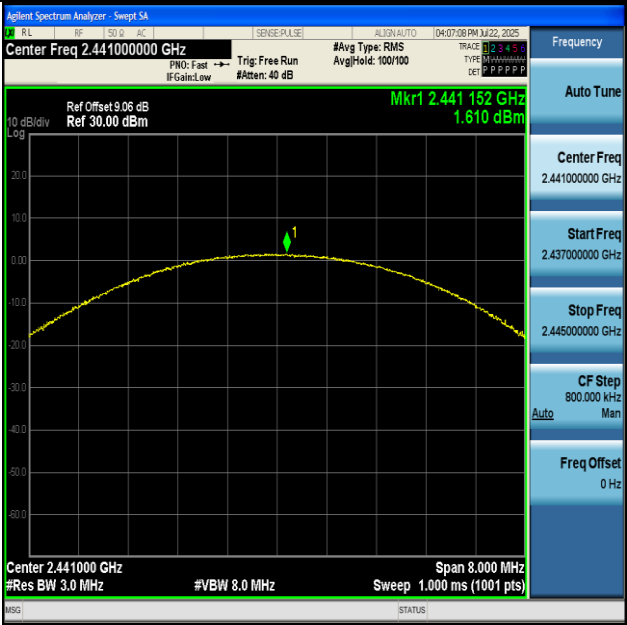




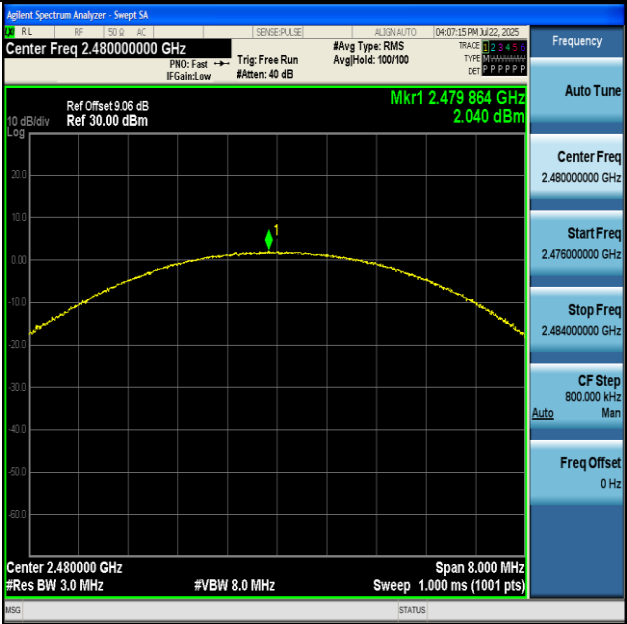
DH5-Ant1-2480-PASS



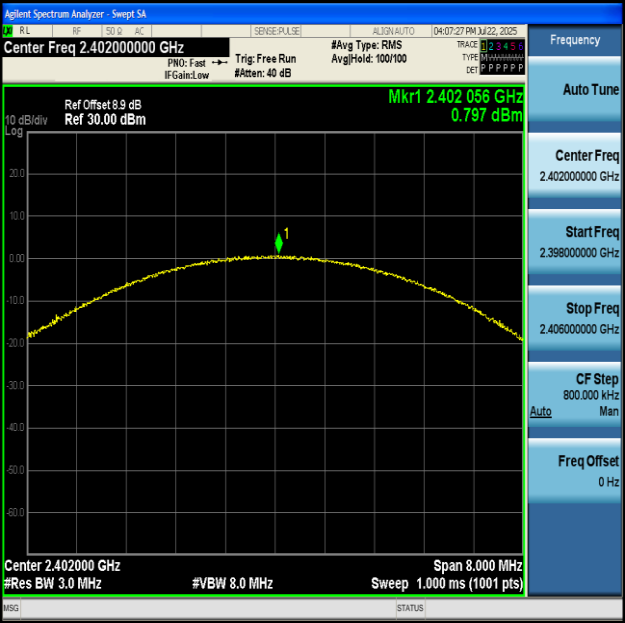
2DH5-Ant1-2402-PASS



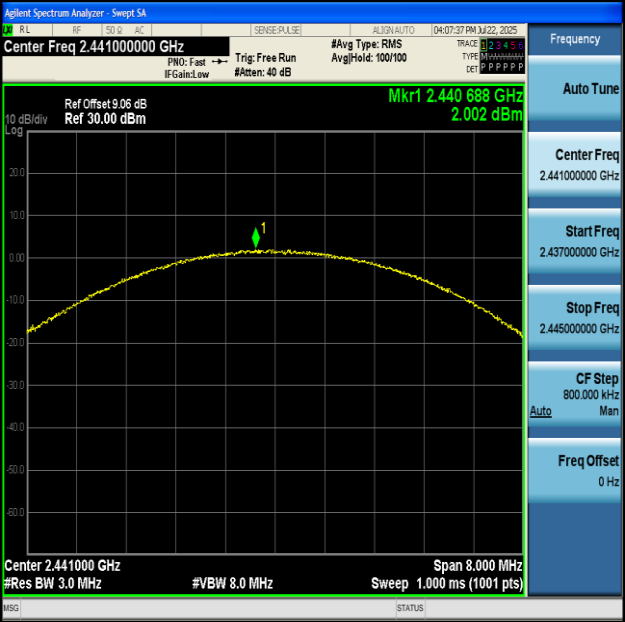
2DH5-Ant1-2441-PASS



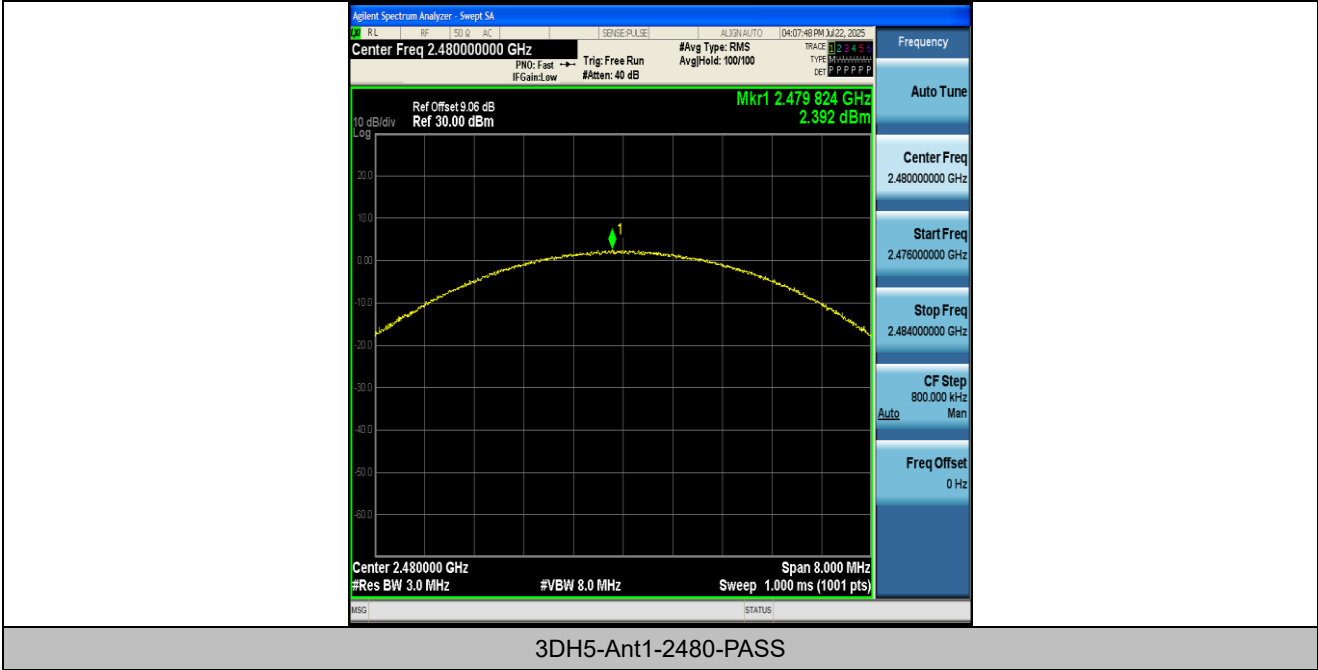
2DH5-Ant1-2480-PASS



3DH5-Ant1-2402-PASS



3DH5-Ant1-2441-PASS



Appendix D: Carrier frequency separation

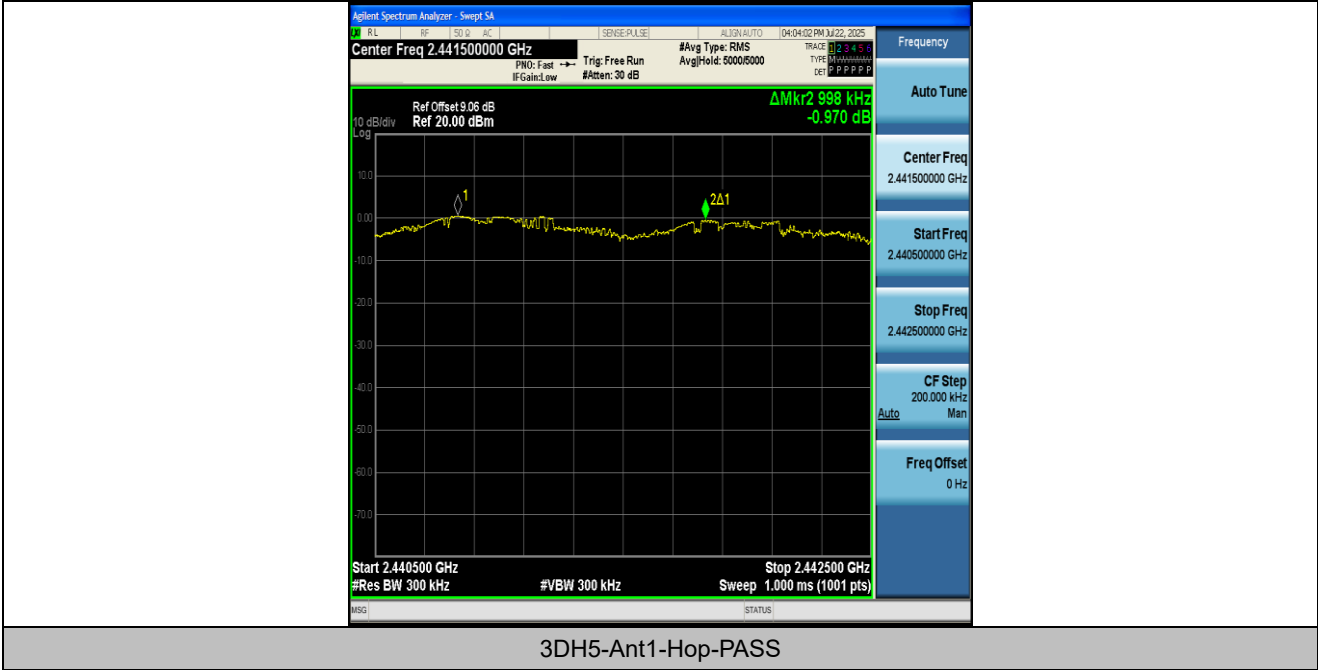
Test Result

Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	0.988	≥ 0.954	PASS
2DH5	Ant1	Hop	1.002	≥ 0.884	PASS
3DH5	Ant1	Hop	0.998	≥ 0.858	PASS

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

Test Graphs





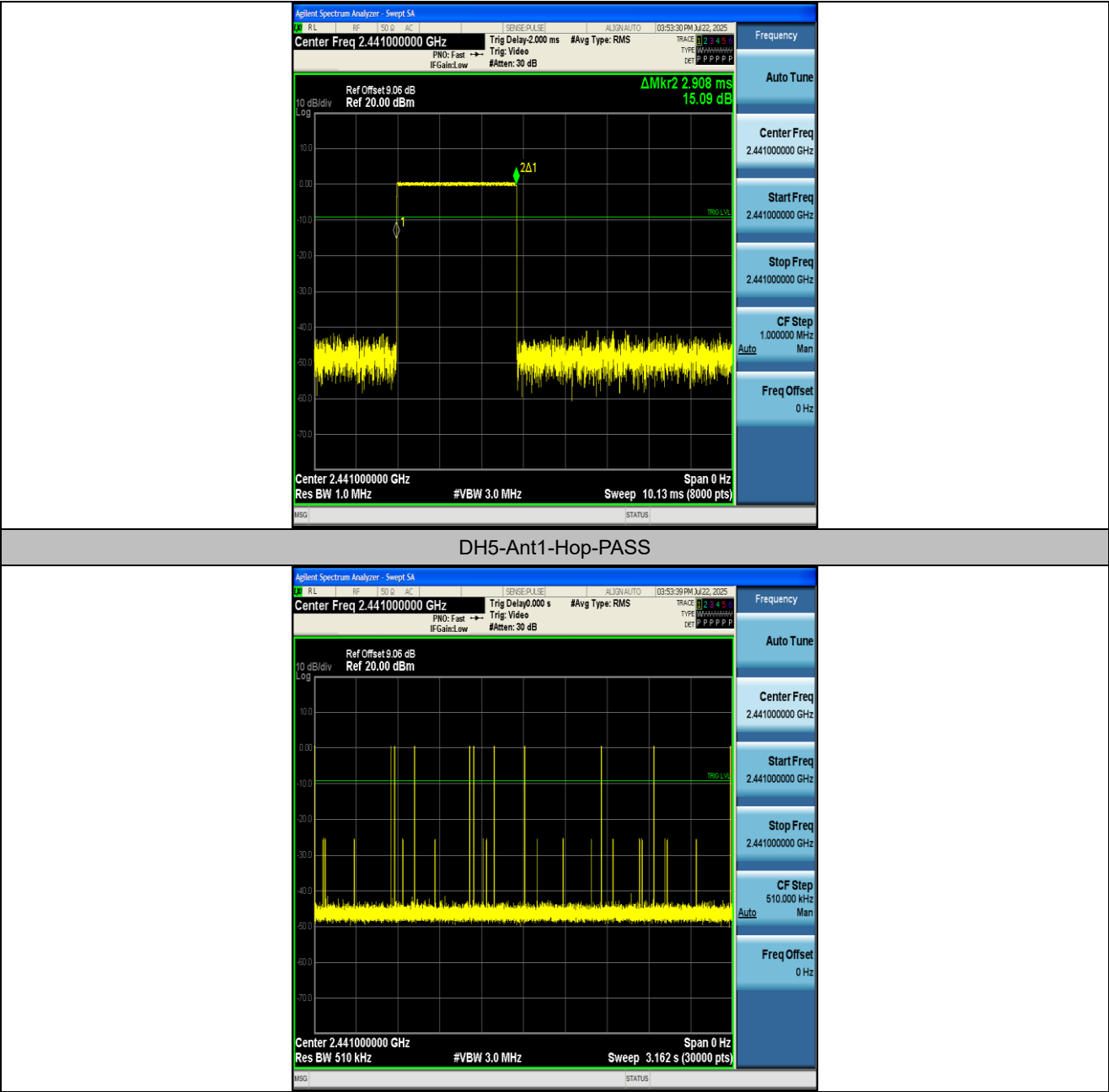
Appendix E: Time of occupancy

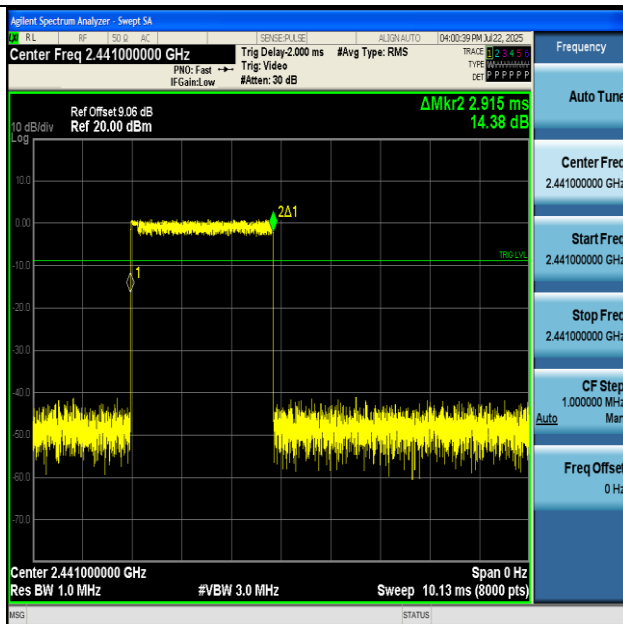
Test Result

Test Mode	Antenna	Frequency [MHz]	Burst Width [ms]	TotalHops [Num]	Result [s]	Limit [s]	Verdict
DH5	Ant1	Hop	2.908	110	0.32	≤0.4	PASS
2DH5	Ant1	Hop	2.915	100	0.292	≤0.4	PASS
3DH5	Ant1	Hop	2.918	120	0.35	≤0.4	PASS

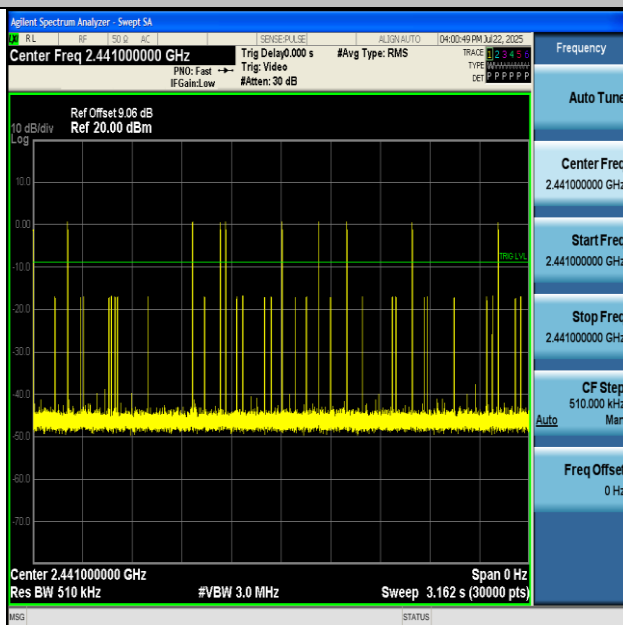
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

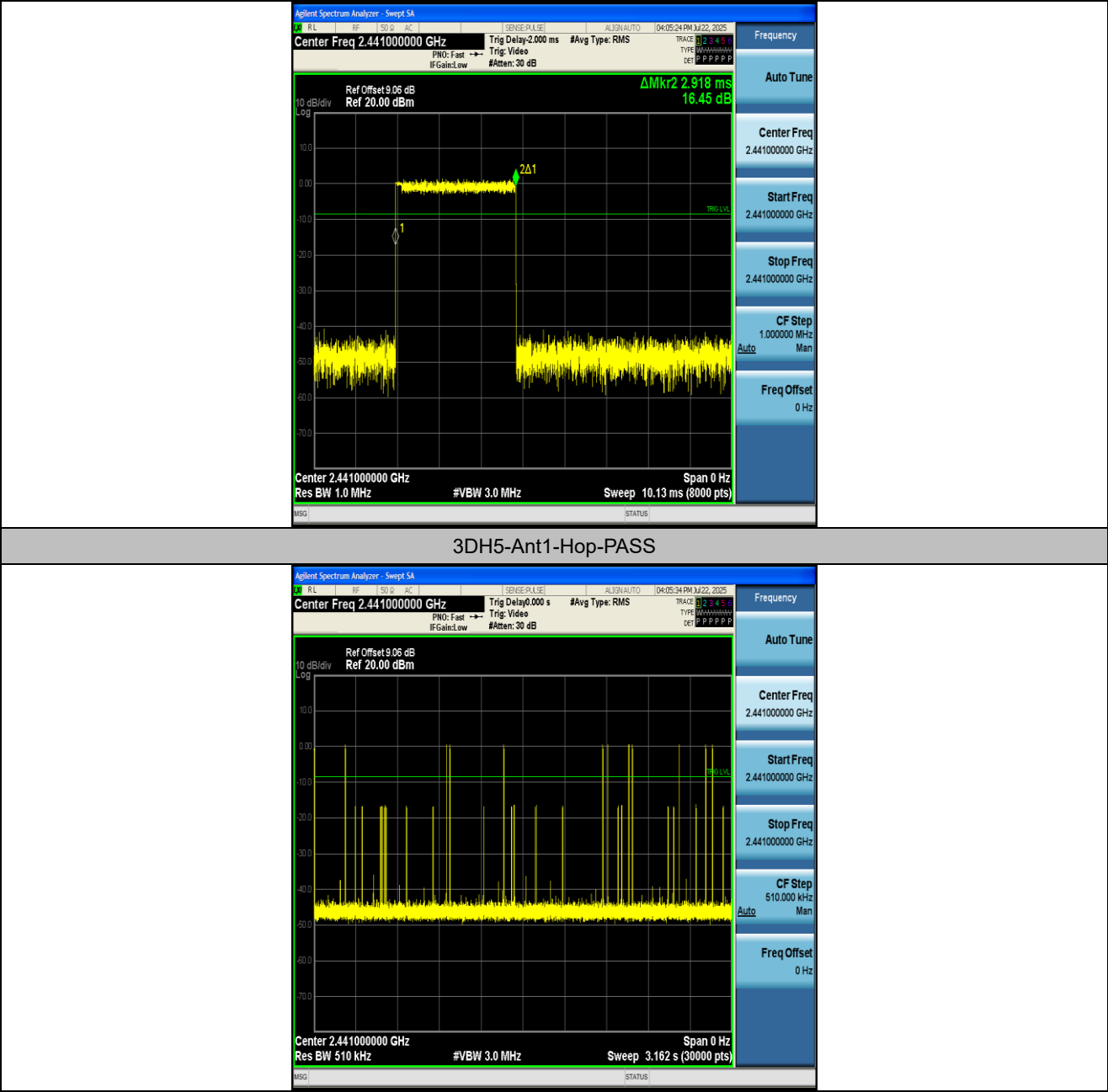
Test Graphs





2DH5-Ant1-Hop-PASS





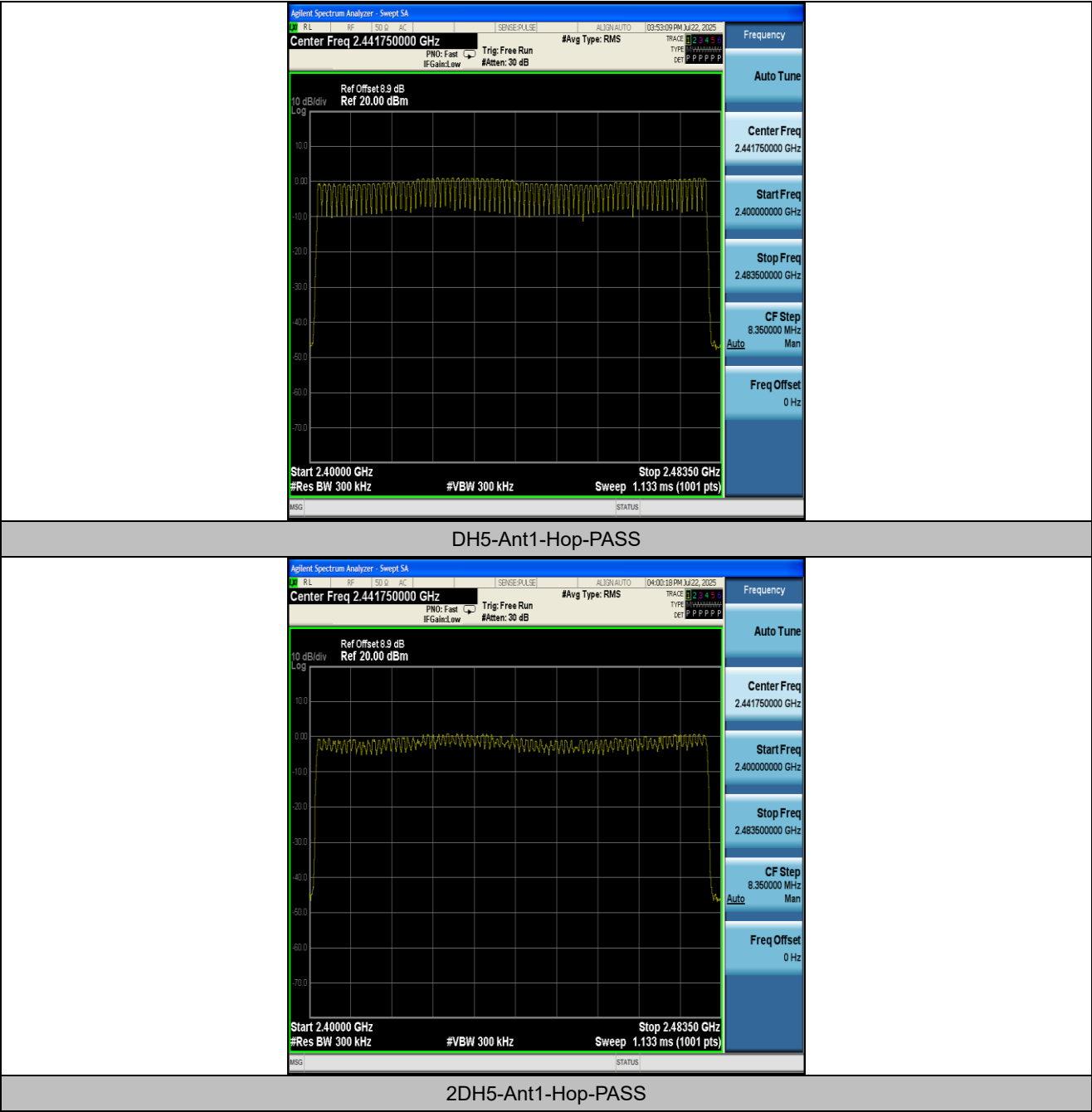
Appendix F: Number of hopping channels

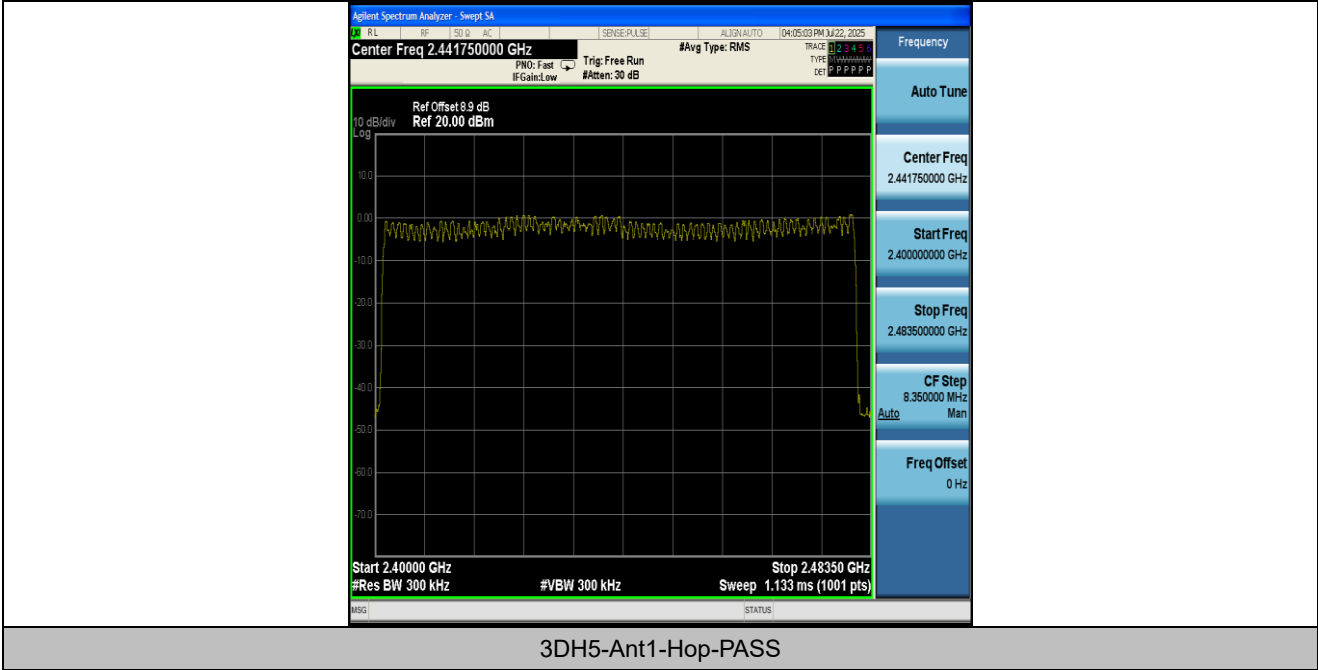
Test Result

Test Mode	Antenna	Frequency [MHz]	Result [Num]	Limit [Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

Test Graphs





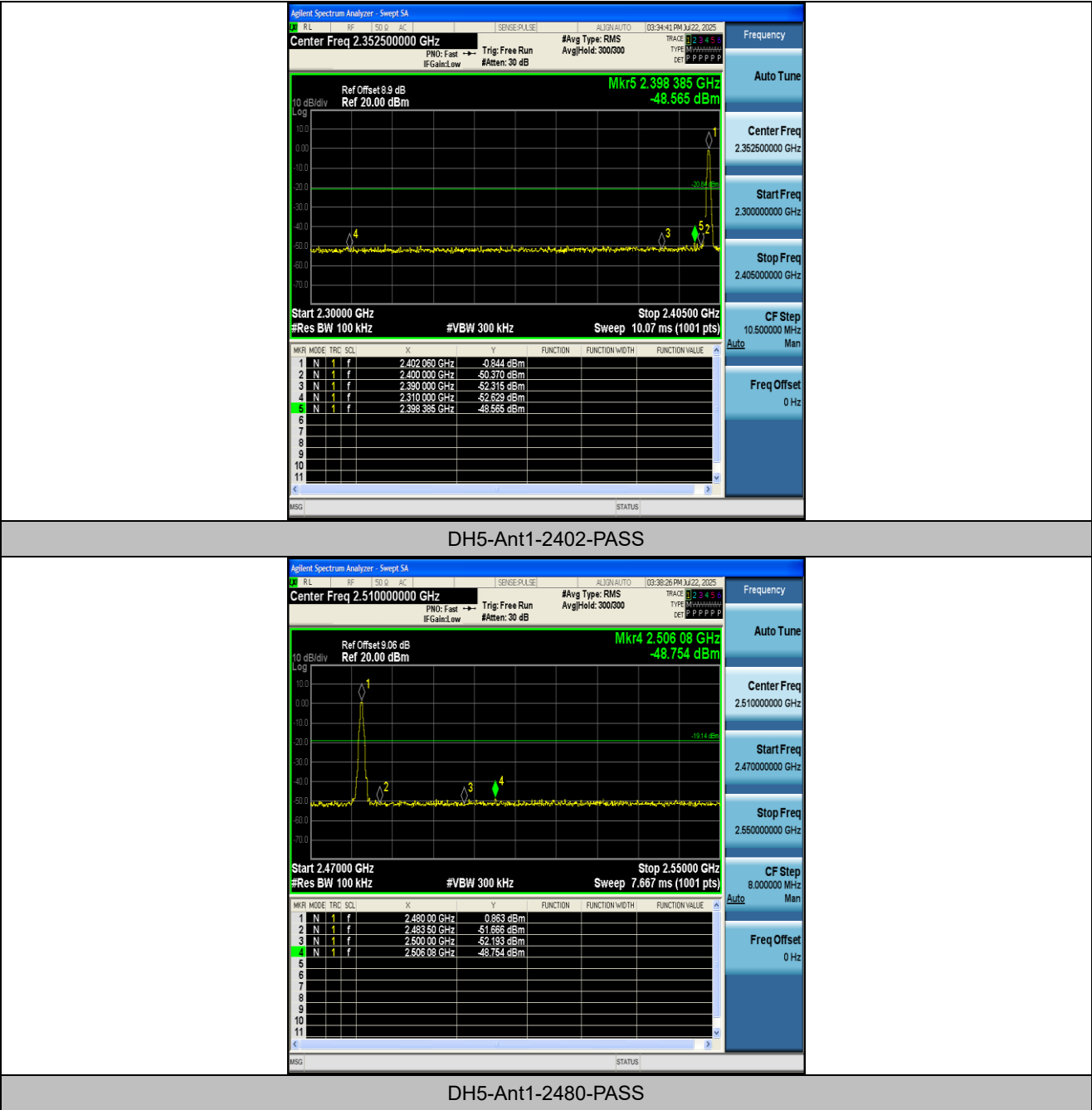
Appendix G: Band edge measurements

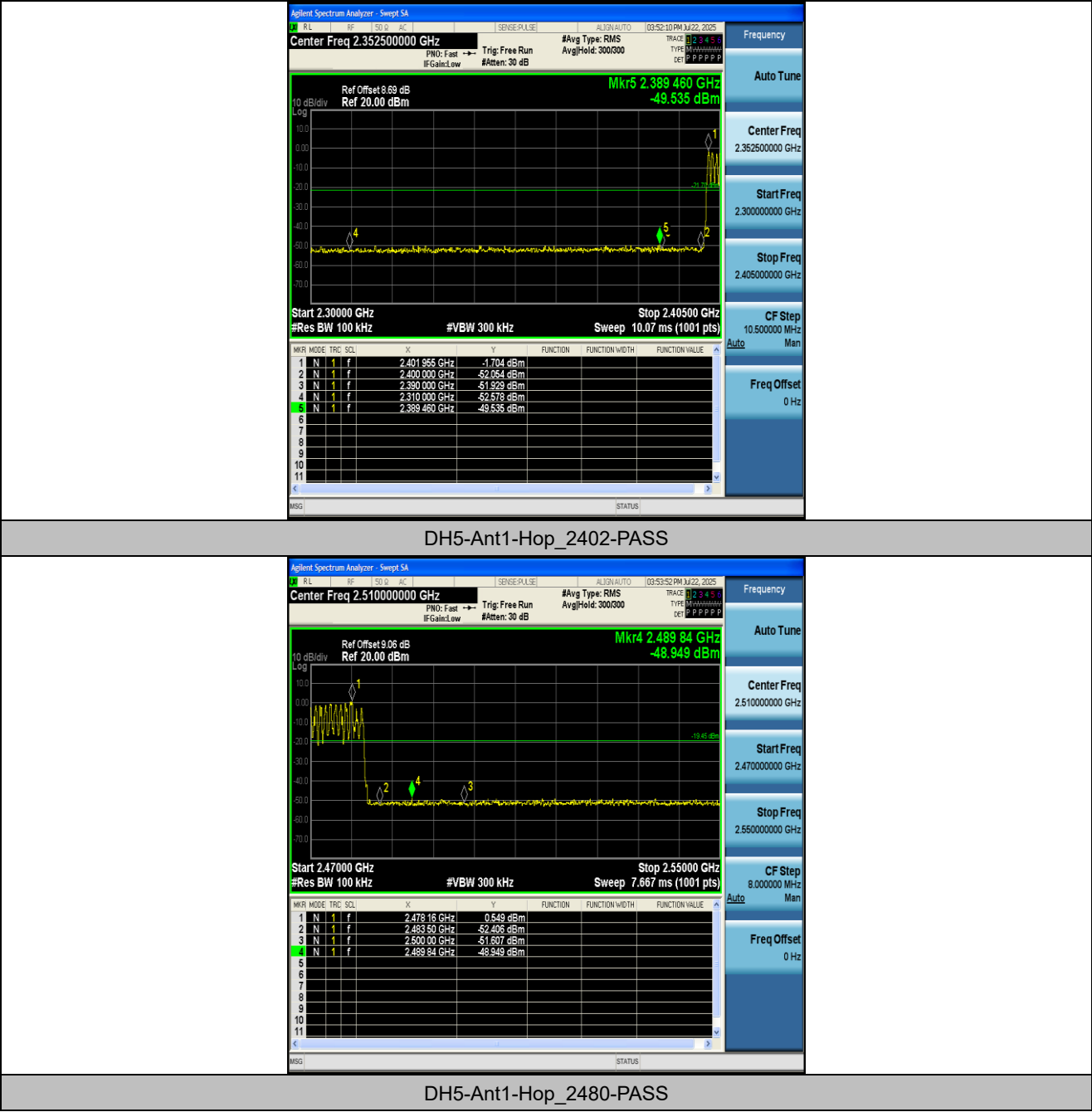
Test Result

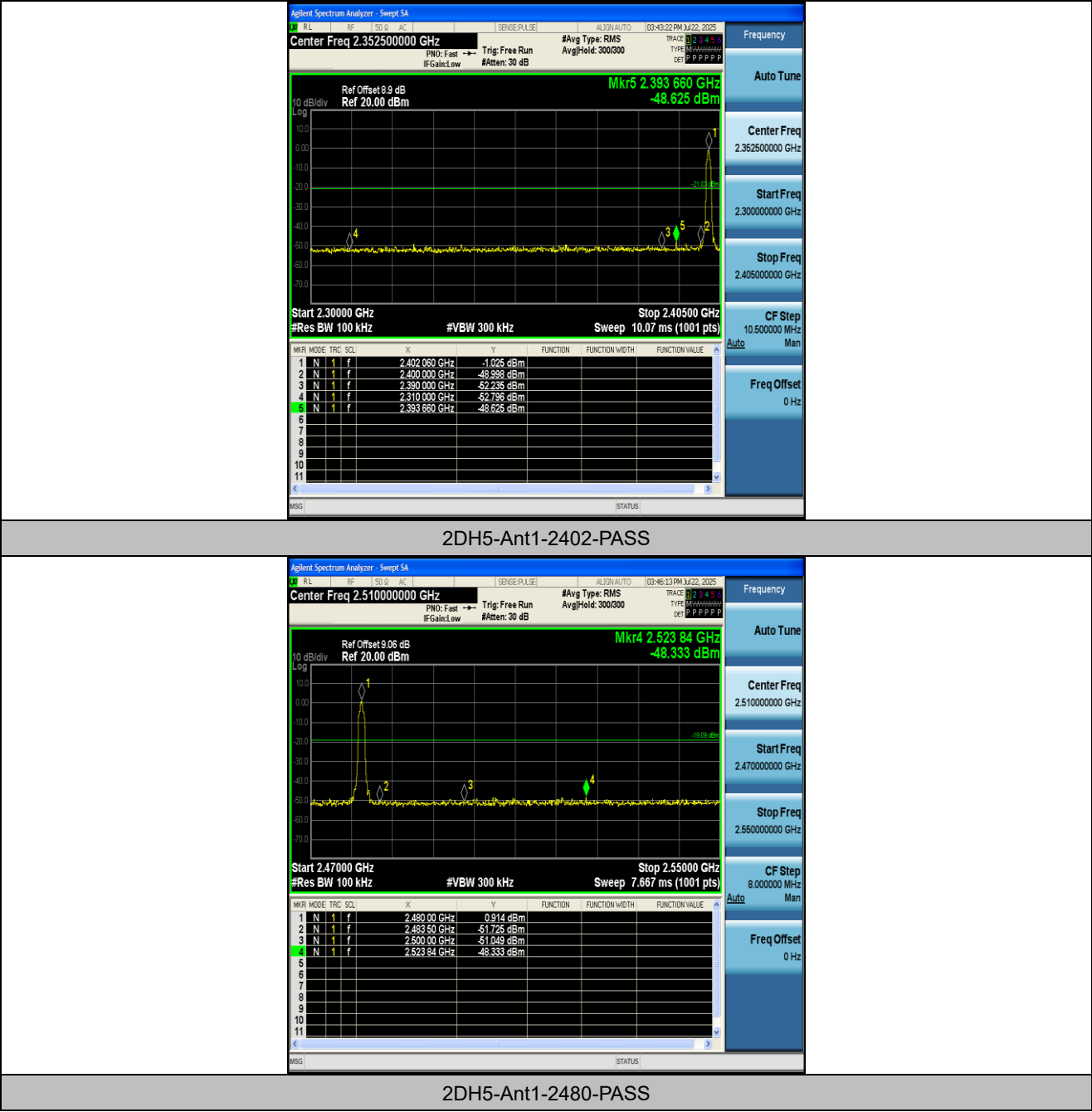
Test Mode	Antenna	Ch.Name	Frequency [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-0.84	-48.57	≤-20.84	PASS
DH5	Ant1	High	2480	0.86	-48.75	≤-19.14	PASS
DH5	Ant1	Low	Hop_2402	-1.70	-49.54	≤-21.7	PASS
DH5	Ant1	High	Hop_2480	0.55	-48.95	≤-19.45	PASS
2DH5	Ant1	Low	2402	-1.03	-48.63	≤-21.03	PASS
2DH5	Ant1	High	2480	0.91	-48.33	≤-19.09	PASS
2DH5	Ant1	Low	Hop_2402	-5.66	-49.09	≤-25.66	PASS
2DH5	Ant1	High	Hop_2480	-2.39	-47.95	≤-22.39	PASS
3DH5	Ant1	Low	2402	-0.93	-48.58	≤-20.93	PASS
3DH5	Ant1	High	2480	0.57	-48.81	≤-19.43	PASS
3DH5	Ant1	Low	Hop_2402	-4.42	-49.17	≤-24.42	PASS
3DH5	Ant1	High	Hop_2480	0.57	-48.26	≤-19.43	PASS

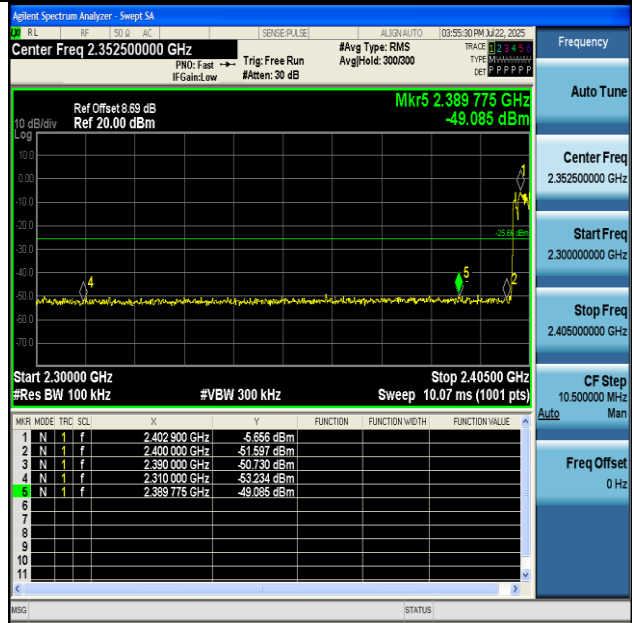
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

Test Graphs

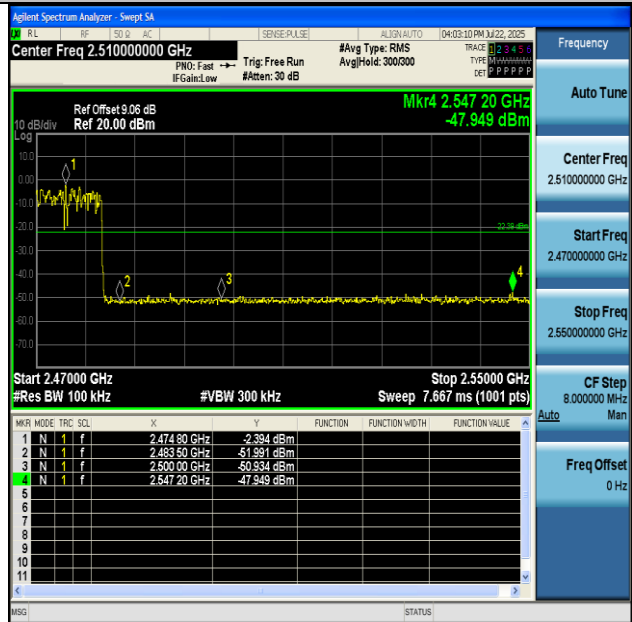




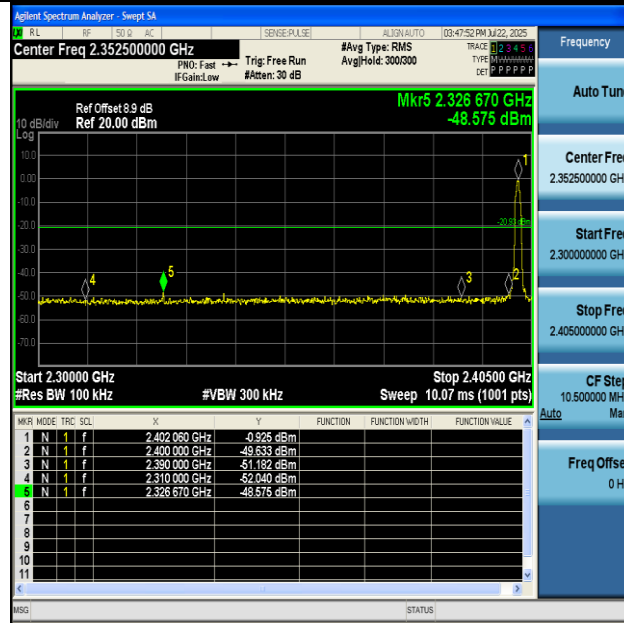




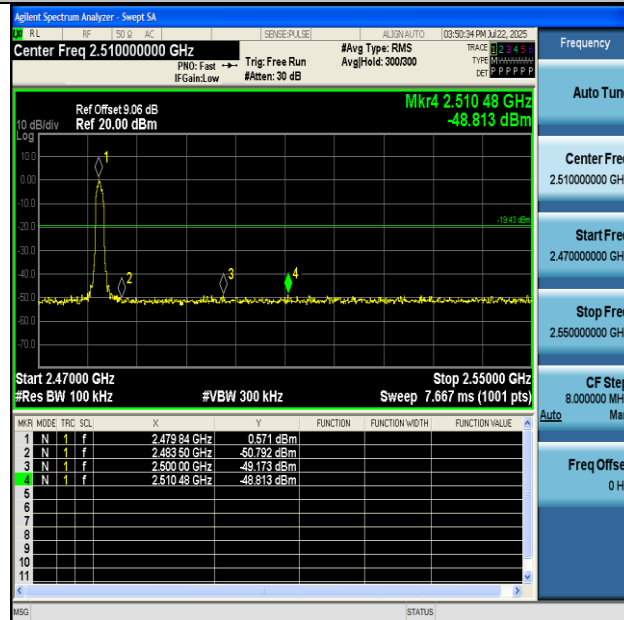
2DH5-Ant1-Hop_2402-PASS



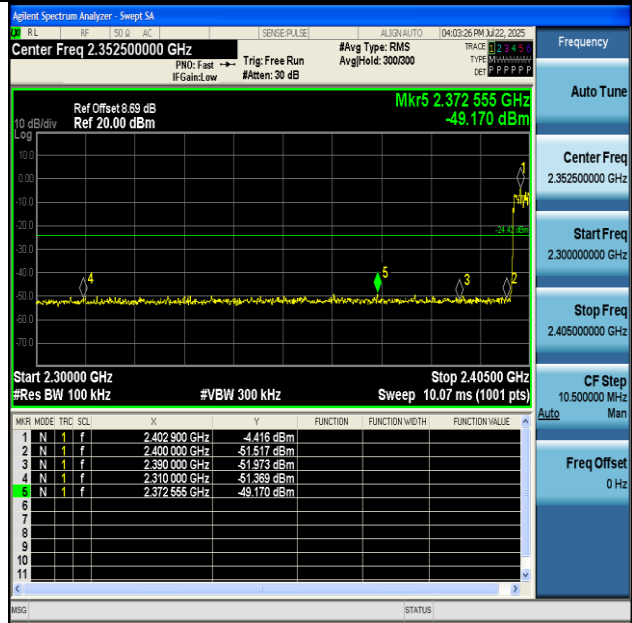
2DH5-Ant1-Hop_2480-PASS



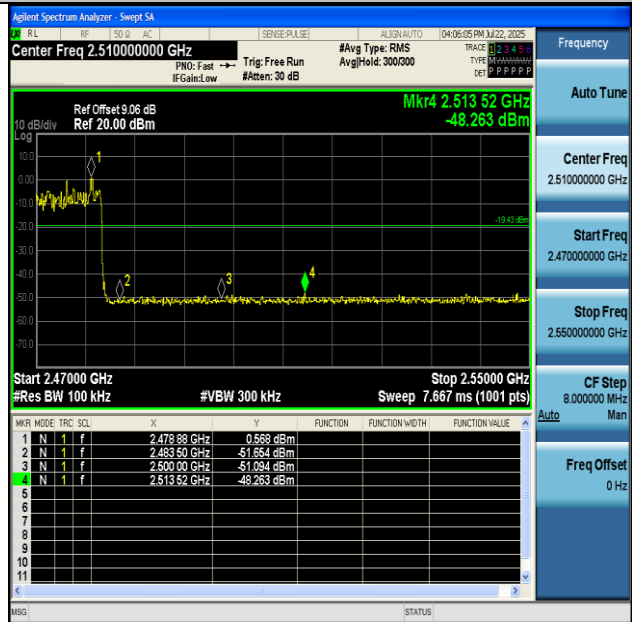
3DH5-Ant1-2402-PASS



3DH5-Ant1-2480-PASS



3DH5-Ant1-Hop_2402-PASS



3DH5-Ant1-Hop_2480-PASS

Appendix H: Conducted Spurious Emission

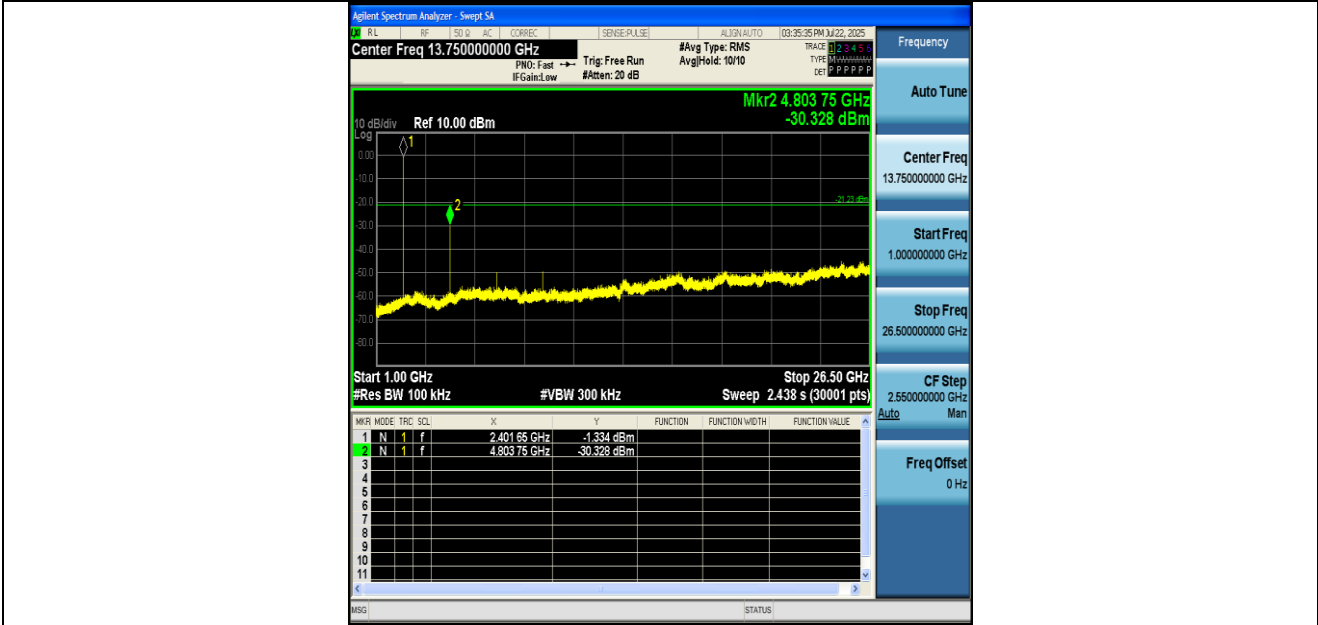
Test Result

Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	0~Reference	-1.23	-1.23	---	PASS
DH5	Ant1	2402	30~1000	-1.23	-62.76	≤-21.23	PASS
DH5	Ant1	2402	1000~26500	-1.23	-30.33	≤-21.23	PASS
DH5	Ant1	2441	0~Reference	-0.39	-0.39	---	PASS
DH5	Ant1	2441	30~1000	-0.39	-62.71	≤-20.39	PASS
DH5	Ant1	2441	1000~26500	-0.39	-29.58	≤-20.39	PASS
DH5	Ant1	2480	0~Reference	0.16	0.16	---	PASS
DH5	Ant1	2480	30~1000	0.16	-62.73	≤-19.84	PASS
DH5	Ant1	2480	1000~26500	0.16	-28.41	≤-19.84	PASS
2DH5	Ant1	2402	0~Reference	-2.62	-2.62	---	PASS
2DH5	Ant1	2402	30~1000	-2.62	-62.88	≤-22.62	PASS
2DH5	Ant1	2402	1000~26500	-2.62	-34.8	≤-22.62	PASS
2DH5	Ant1	2441	0~Reference	-1.06	-1.06	---	PASS
2DH5	Ant1	2441	30~1000	-1.06	-63.08	≤-21.06	PASS
2DH5	Ant1	2441	1000~26500	-1.06	-35.37	≤-21.06	PASS
2DH5	Ant1	2480	0~Reference	0.61	0.61	---	PASS
2DH5	Ant1	2480	30~1000	0.61	-62.98	≤-19.39	PASS
2DH5	Ant1	2480	1000~26500	0.61	-30.65	≤-19.39	PASS
3DH5	Ant1	2402	0~Reference	-4.60	-4.60	---	PASS
3DH5	Ant1	2402	30~1000	-4.60	-63.19	≤-24.6	PASS
3DH5	Ant1	2402	1000~26500	-4.60	-36.46	≤-24.6	PASS
3DH5	Ant1	2441	0~Reference	-0.42	-0.42	---	PASS
3DH5	Ant1	2441	30~1000	-0.42	-62.56	≤-20.42	PASS
3DH5	Ant1	2441	1000~26500	-0.42	-33.85	≤-20.42	PASS
3DH5	Ant1	2480	0~Reference	0.62	0.62	---	PASS
3DH5	Ant1	2480	30~1000	0.62	-63.3	≤-19.38	PASS
3DH5	Ant1	2480	1000~26500	0.62	-31.88	≤-19.38	PASS

Note: offset(dB) in Reference test plots = cable loss(dB) + attenuator factor(dB); For spurious emissions plots from 30MHz to 26.5GHz, the cable loss and attenuator factors have been set in the 'Input Correction' of the Spectrum Analyzer during the test.

Test Graphs

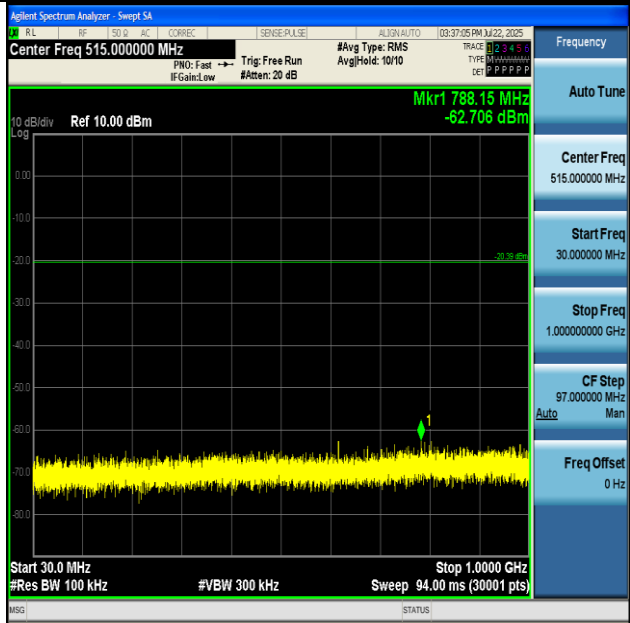




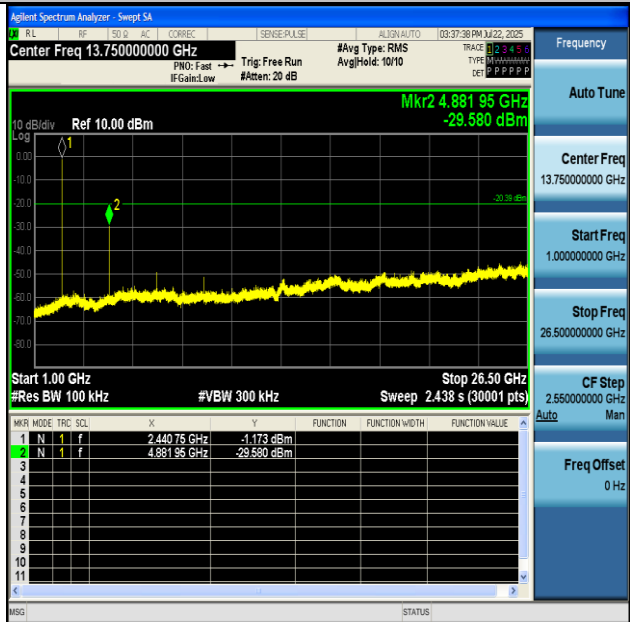
DH5-Ant1-2402-1000~26500-PASS



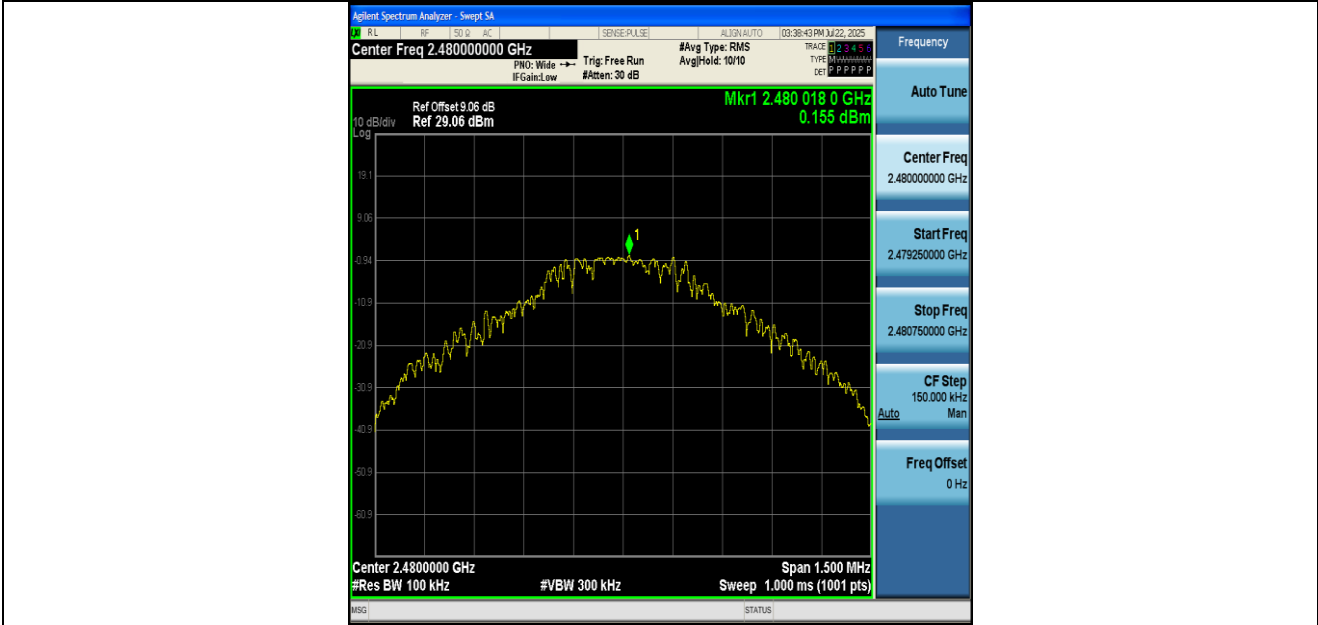
DH5-Ant1-2441-0~Reference-PASS



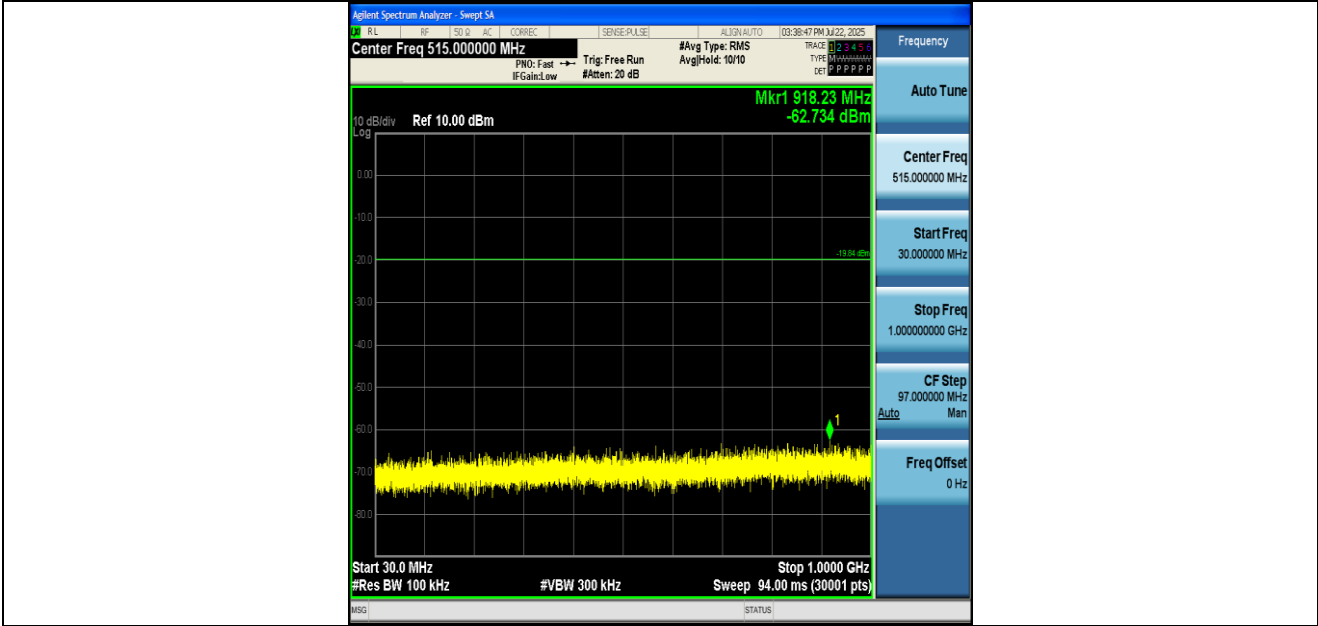
DH5-Ant1-2441-30~1000-PASS



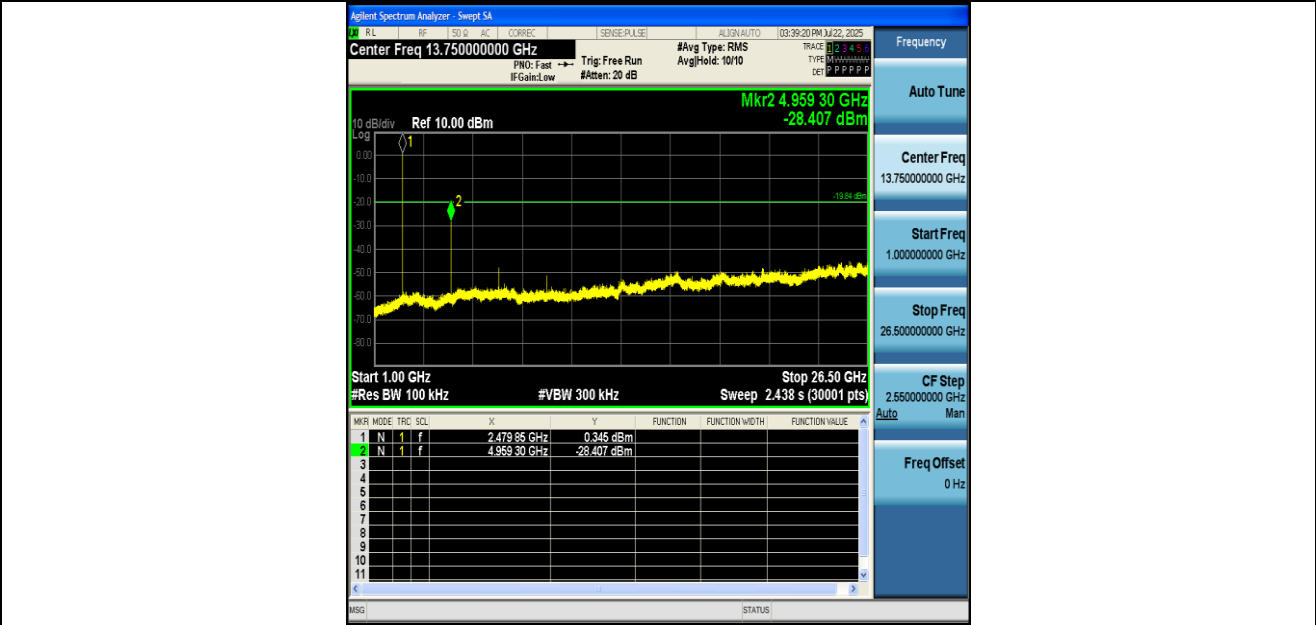
DH5-Ant1-2441-1000~26500-PASS



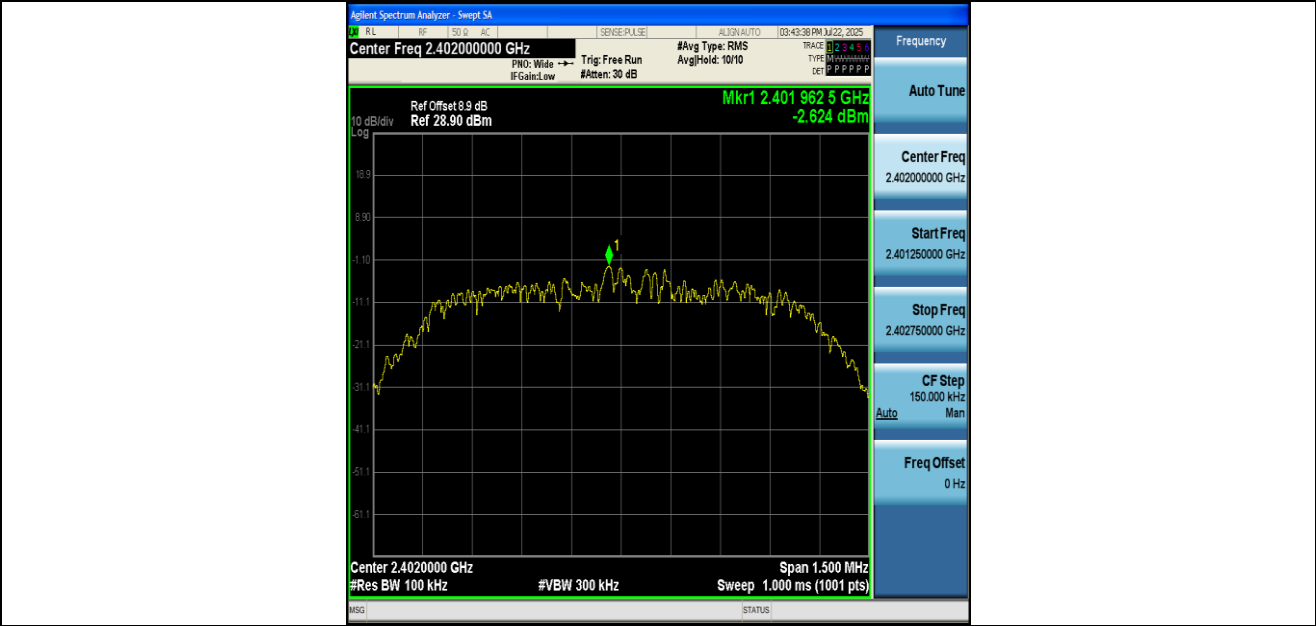
DH5-Ant1-2480-0~Reference-PASS



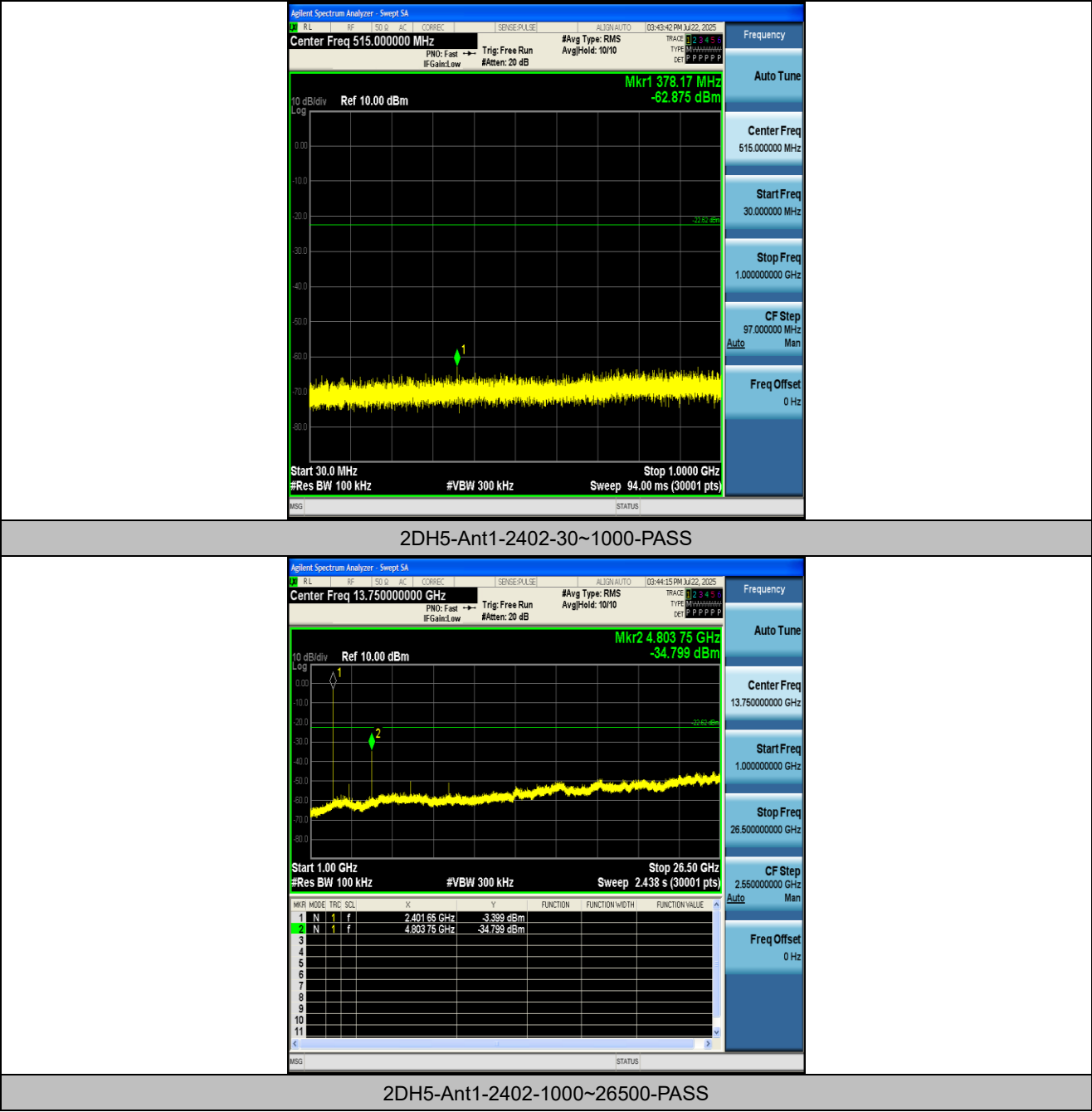
DH5-Ant1-2480-30~1000-PASS

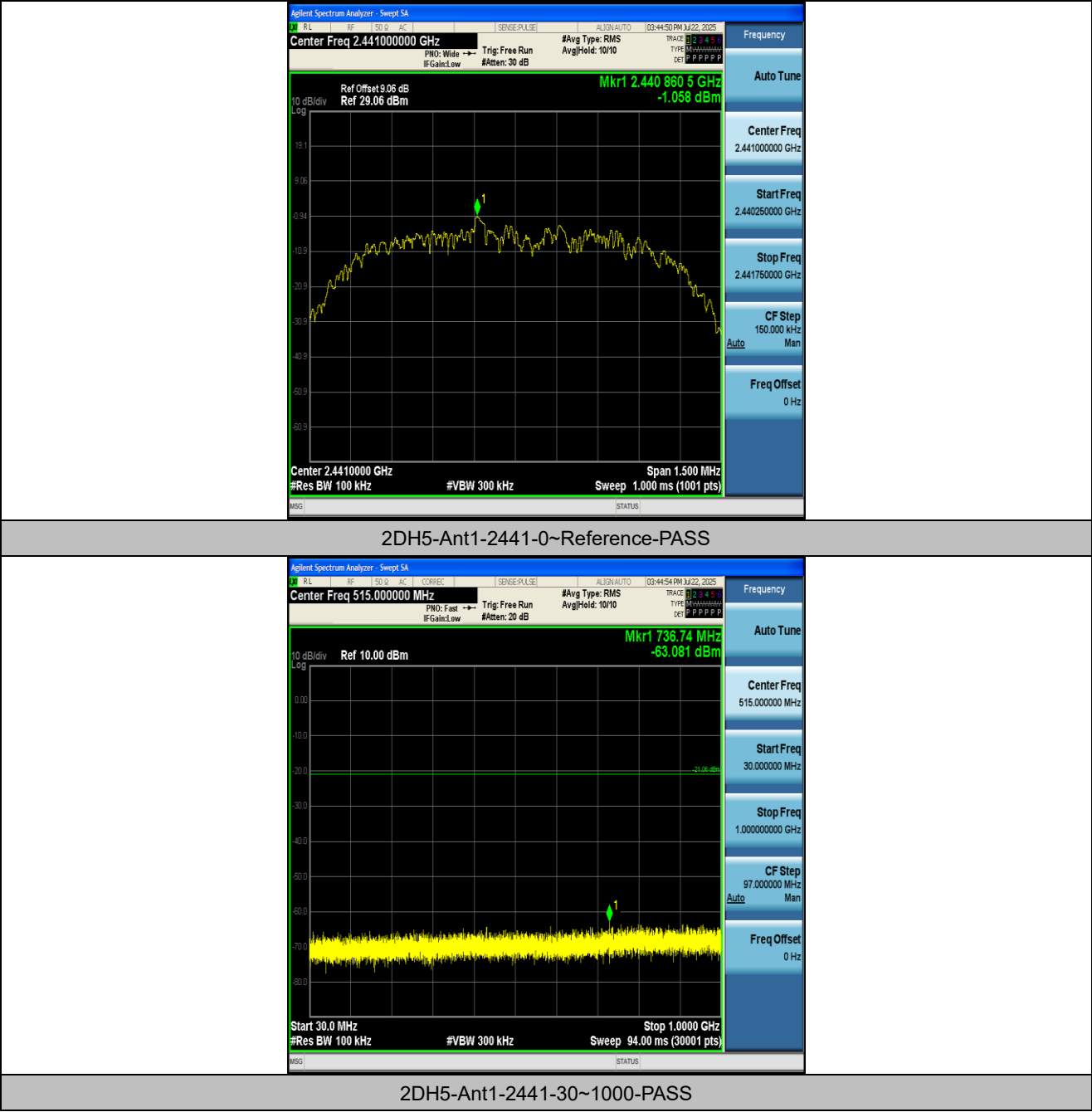


DH5-Ant1-2480-1000~26500-PASS

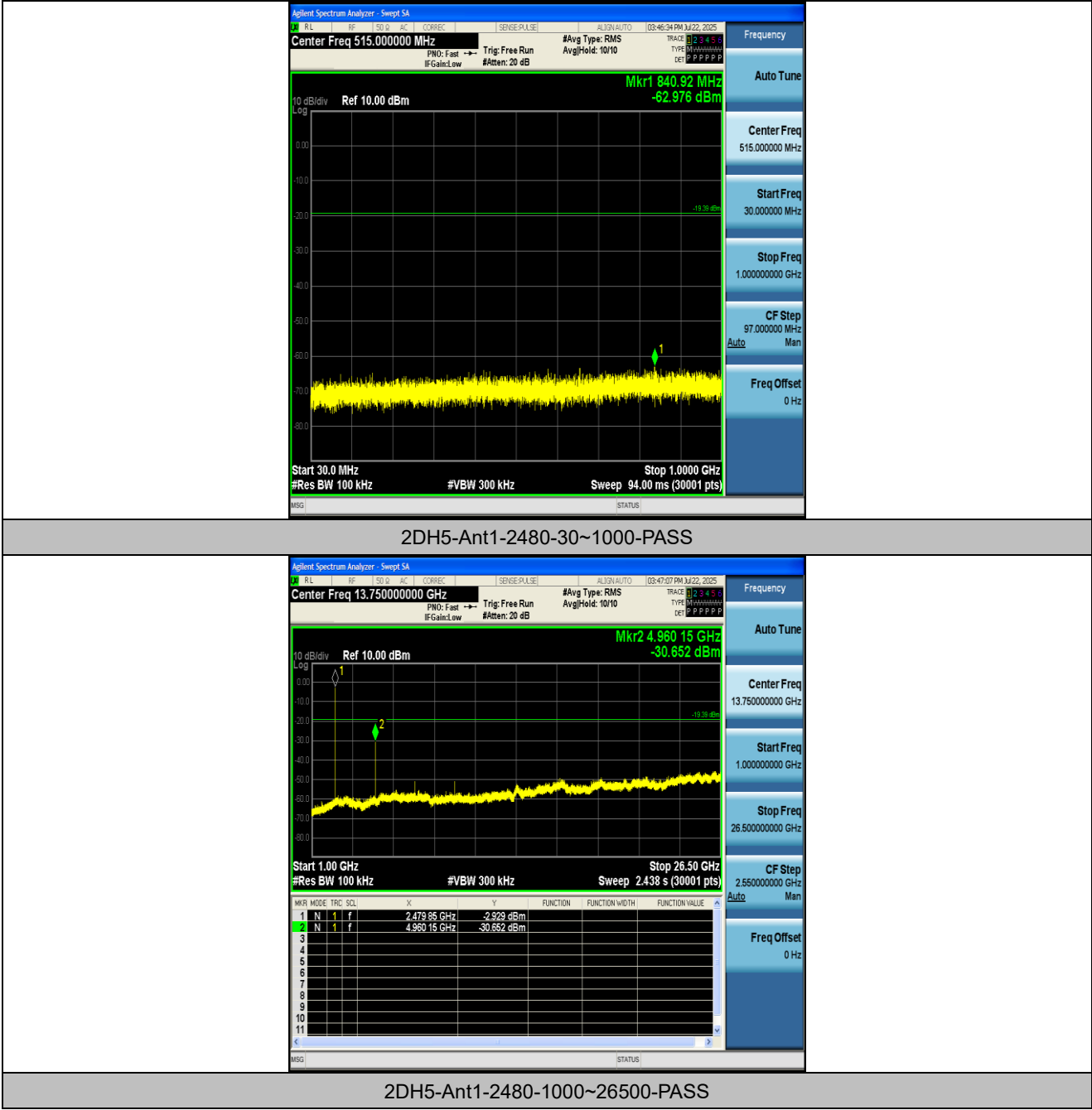


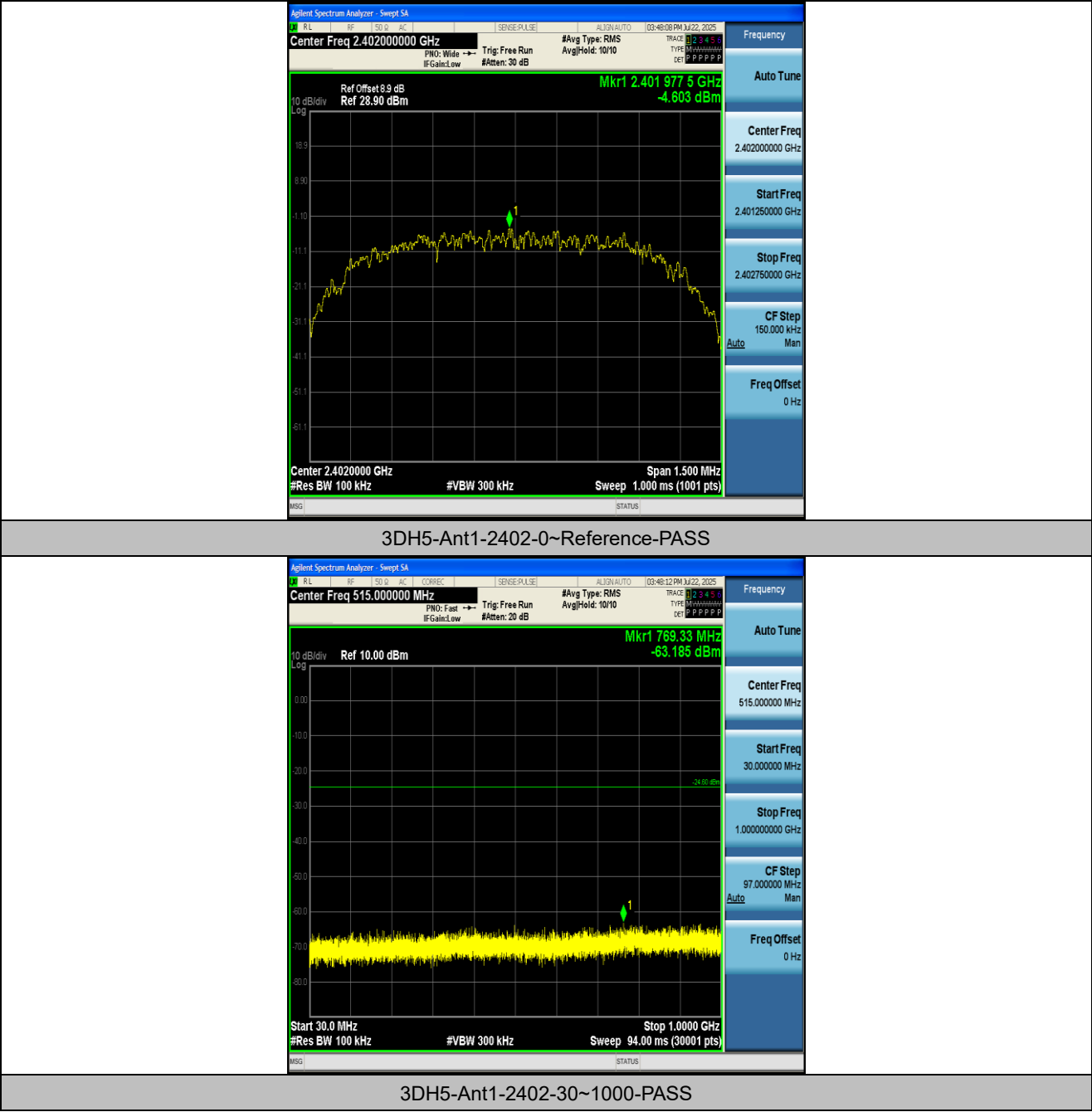
2DH5-Ant1-2402-0~Reference-PASS

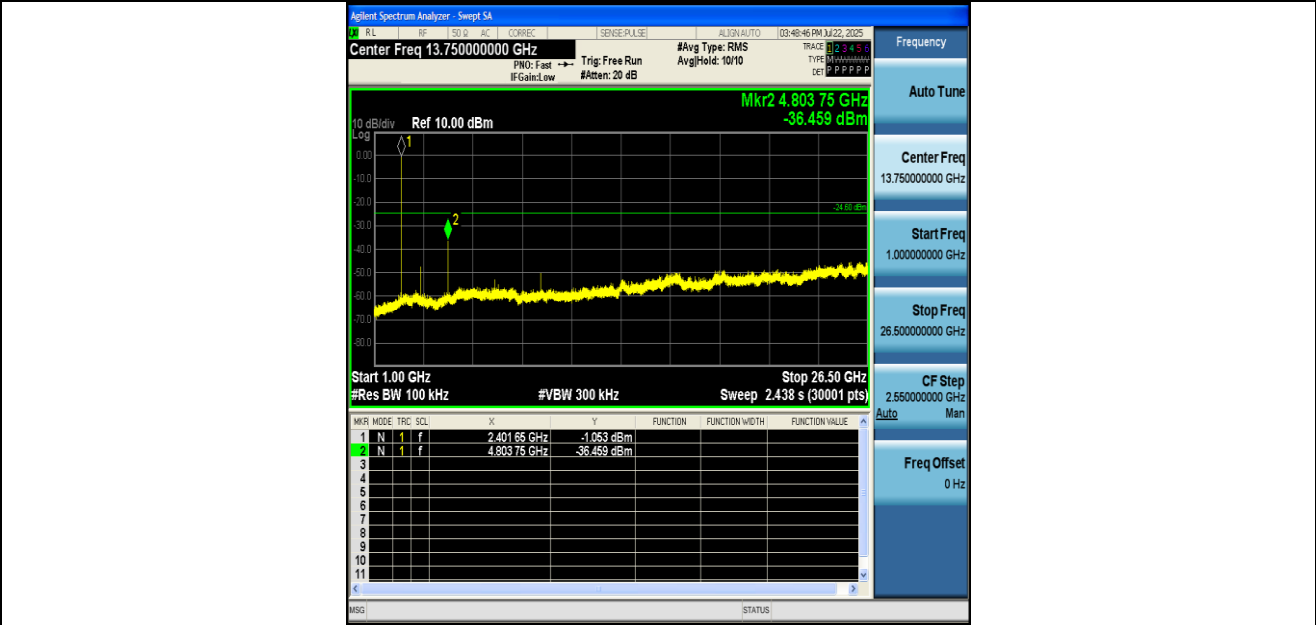








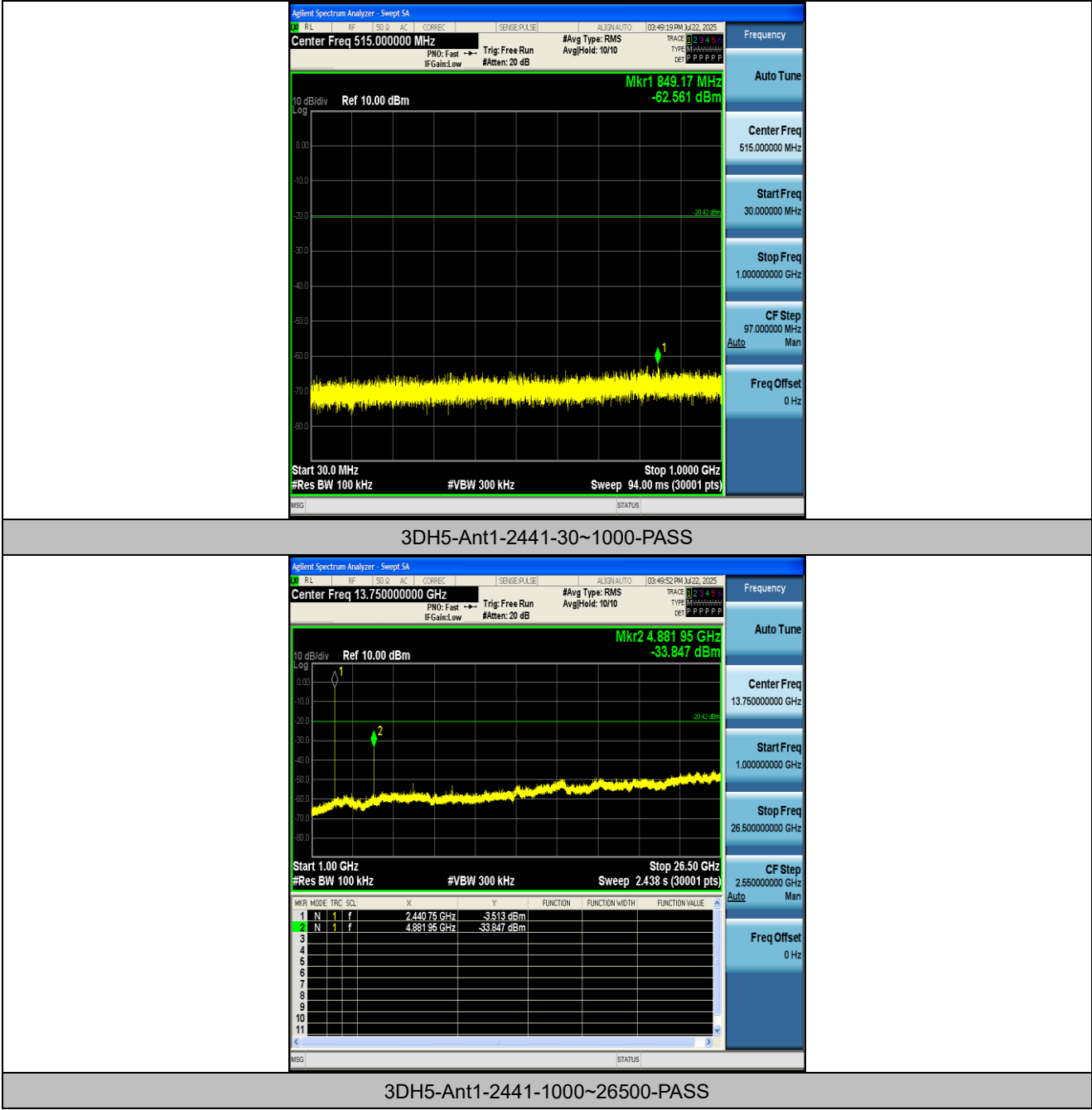




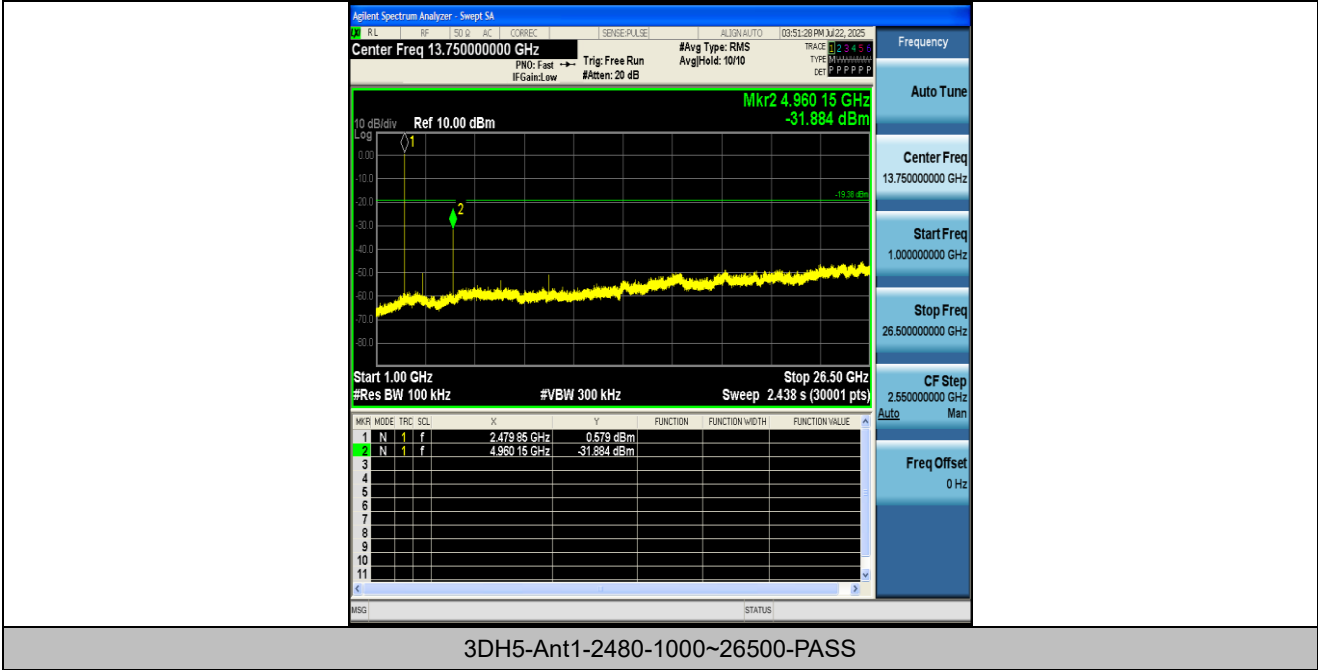
3DH5-Ant1-2402-1000~26500-PASS



3DH5-Ant1-2441-0~Reference-PASS







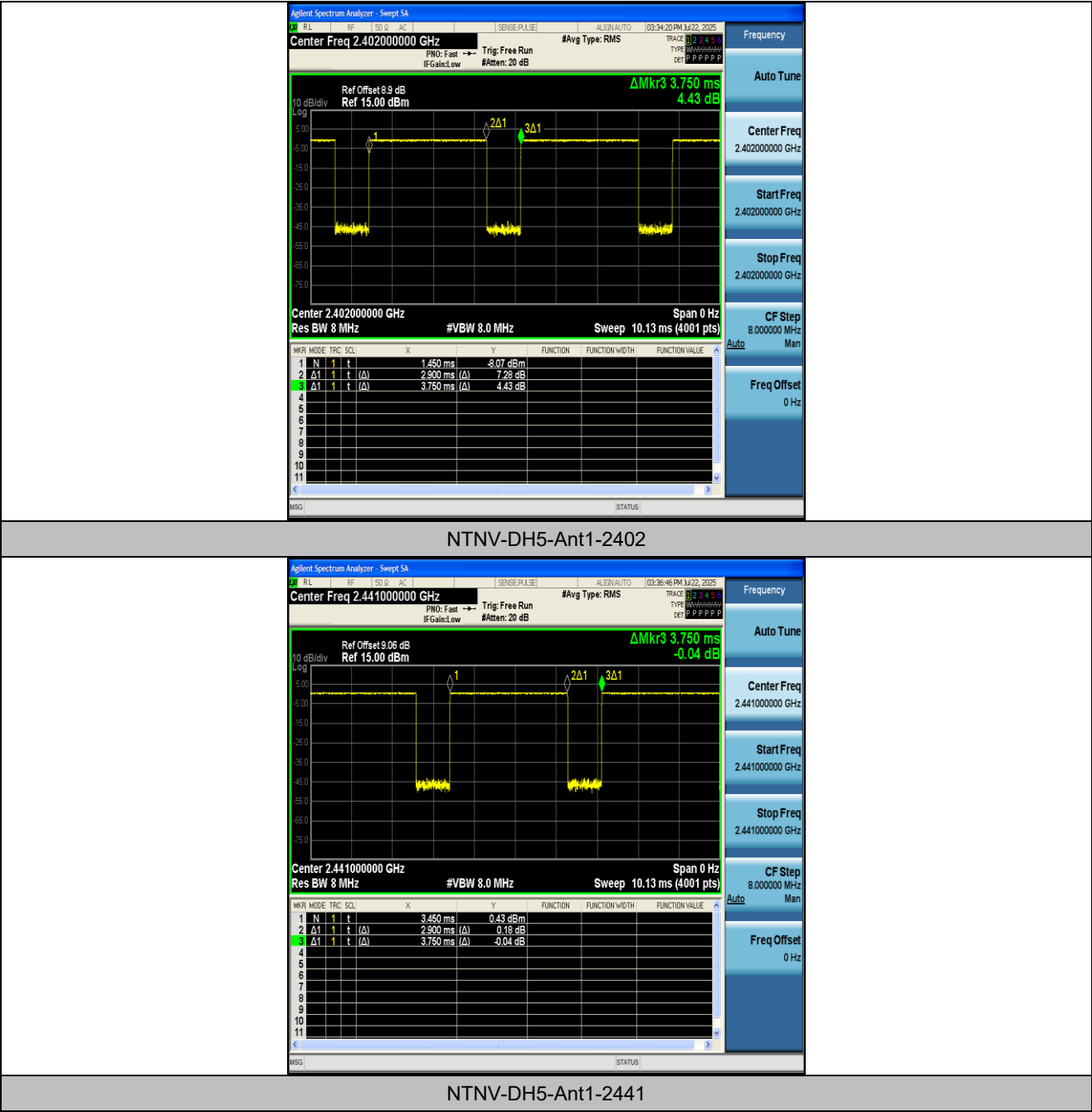
Appendix I: Duty Cycle

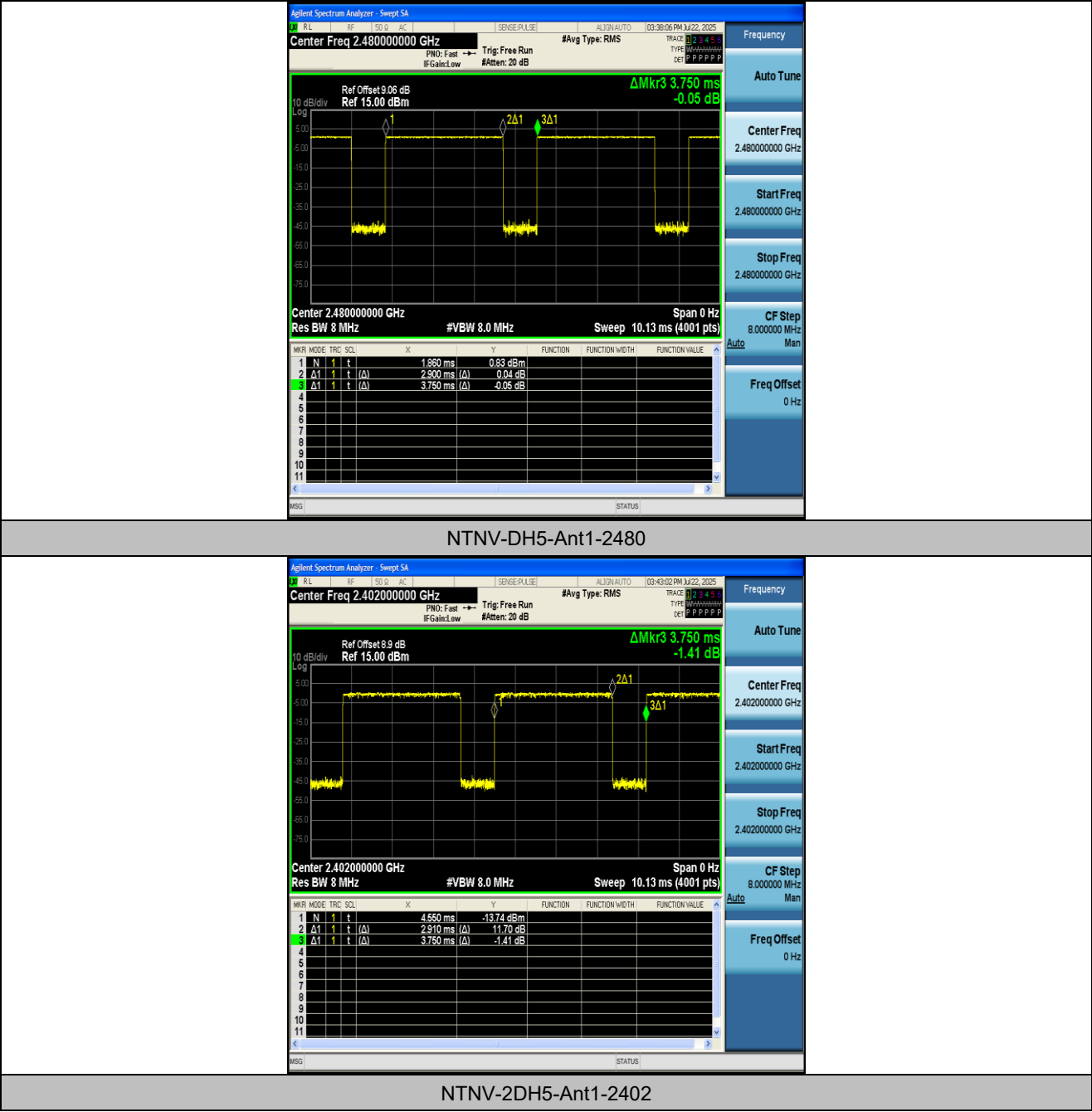
Test Result

Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
DH5	Ant1	2402	2.90	3.75	77.33	1.12
DH5	Ant1	2441	2.90	3.75	77.33	1.12
DH5	Ant1	2480	2.90	3.75	77.33	1.12
2DH5	Ant1	2402	2.91	3.75	77.60	1.10
2DH5	Ant1	2441	2.91	3.75	77.60	1.10
2DH5	Ant1	2480	2.91	3.75	77.60	1.10
3DH5	Ant1	2402	2.91	3.75	77.60	1.10
3DH5	Ant1	2441	2.91	3.75	77.60	1.10
3DH5	Ant1	2480	2.91	3.75	77.60	1.10

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

Test Graphs





NTNV-2DH5-Ant1-2402

Agilent Spectrum Analyzer - Sweep 5A

Center Freq 2.441000000 GHz

Ref Offset 9.06 dB
Ref 15.00 dBm

ΔMkr3 3.750 ms
0.00 dB

10 dB/div
Log

5.00
-5.00
-15.0
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0

Center 2.441000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 10.13 ms (4001 pts)
Span 0 Hz

MNR	MODE	TRG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	t	4.840 ms	0.34 dBm			
2	Δ1	1	t (Δ)	2.910 ms (Δ)	-16.62 dB			
3	Δ1	1	t (Δ)	3.750 ms (Δ)	0.00 dB			

Frequency

Auto Tune

Center Freq 2.441000000 GHz

Start Freq 2.441000000 GHz

Stop Freq 2.441000000 GHz

CF Step 8.0000000 MHz

Auto Man

Freq Offset 0 Hz

NTNV-2DH5-Ant1-2441

Agilent Spectrum Analyzer - Sweep 5A

Center Freq 2.480000000 GHz

Ref Offset 9.06 dB
Ref 15.00 dBm

ΔMkr3 3.750 ms
-1.60 dB

10 dB/div
Log

5.00
-5.00
-15.0
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0

Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 10.13 ms (4001 pts)
Span 0 Hz

MNR	MODE	TRG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	t	1.550 ms	-0.63 dBm			
2	Δ1	1	t (Δ)	2.910 ms (Δ)	-4.90 dB			
3	Δ1	1	t (Δ)	3.750 ms (Δ)	-1.60 dB			

Frequency

Auto Tune

Center Freq 2.480000000 GHz

Start Freq 2.480000000 GHz

Stop Freq 2.480000000 GHz

CF Step 8.0000000 MHz

Auto Man

Freq Offset 0 Hz

NTNV-2DH5-Ant1-2480

